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THE IRON TRADE REVIEW

Volume LV Cleveland, July 23, 1914 *No. 4*

Finished Prices Advanced

By Steel Corporation and Leading Independents--Improved Prospects For Wire Products

The United States Steel Corporation has increased its percentage of steel works capacity in operation to 70, a gain of 5 per cent since the report of a week ago. The Corporation has blown in three more blast furnaces. Its new business and specifications for the first three weeks of July show a considerable improvement in comparison with the same period in June. Reports from independent companies vary to a considerable extent, some reporting improvement, while others see very little, if any, change for the better. Recent sales of southern pig iron are estimated to amount to more than 50,000 tons.

Pig Iron

Information which has slowly leaked out shows conclusively that recent sales of pig iron in the Buffalo district have amounted to fully 150,000 tons, including 25,000 tons for the American Radiator Co. and 30,000 tons for the New York Car Wheel Co. The prices were low and on at least a part of the tonnage $12.50 for No. 2X at furnace was shaded. Since the heavy sales by Buffalo makers, prices in that territory have been advanced. The General Electric Co., which recently bought 10,000 tons, is inquiring for 9,600 tons additional. Virginia iron is weak and prices are about 25 cents lower. The sales of malleable and foundry iron in the Chicago district show considerable improvement. One Cincinnati dealer in southern iron has sold a fair tonnage on the basis of $10, Birmingham, for No. 2 prompt and $10.25 to $10.50 for last half delivery. The only important transaction in steel-making iron is the sale of 15,000 tons of basic to the Kokomo Steel & Wire Co., at about $13, lake furnace.

Finished Materials

In finished materials, the action of the American Steel & Wire Co. in advancing its quotation on wire products $1 per ton and the advancing of prices of shapes, plates and bars for deliveries on which the quotation of 1.10c, Pittsburgh, had been made, by the Carnegie Steel Co., aroused much interest. The action of the Corporation subsidiaries has been followed by most of the independent companies, but the 1.10c quotation on plates, shapes and bars has not entirely disappeared. In the case of wire products, the advance is due largely to the prospect of improvement on account of the great crops. There has also been improvement in some districts in shapes, plates and bars, but the advance on these products is due largely to the determination of the mills not to sell at prices that are unprofitable.

Sheets and Plates

Improvement in demand for sheets is reported in several centers and makers are showing a disposition to adhere to higher quotations. The plate market in the Chicago district has been benefited somewhat by recent orders for cars. The building of 30 steel barges for a new Hudson river line will require about 15,000 tons. The barges will be built at Albany.

Coke

The United Gas Improvement Co., Philadelphia, is in the market for its annual requirements of coke, amounting to about 50,000 tons. The Reading Iron Co. has contracted for 20,000 tons of furnace coke. The Connellsville coke market is extremely dull.

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Some Features of Steel Statistics

THAT statistics of production do not always indicate whether business is prosperous or not is shown in the figures of the Bureau of Statistics of the American Iron and Steel Institute for the past two years. From a standpoint of prices and demand for products, the years 1912 and 1913 differed decidedly. The year 1912 was one of wonderful recovery from the depression of the preceding year. Beginning with cheerful sentiment, hopes of the optimistic were realized early in the year, and as the months passed, the volume of business increased, until sales during the last half of the year were very heavy and prices were much higher than at the opening of the year. The year 1913 opened with heavy specifying and with great activity in all manufacturing lines, but after a few months, conditions were radically changed and prices touched the lowest points in 18 months. A decline of from $6 to $8 a ton in finished steel products and from $3 to $3.50 per ton in pig iron was recorded. In the production of steel, however, a new record was made last year. The production in 1913, the largest in the country's history, was 31,300,874 tons, or 49,571 tons more than the previous record made in 1912.

An interesting feature of the statistics for last year is that the production of steel exceeded that of pig iron by only 334,573 tons. The output of steel first exceeded that of pig iron in 1911, the excess of steel being 26,559 tons, and in 1912, the excess was 1,524,366 tons. As the excess of steel production over that of pig iron is due to the use of scrap in open-hearth steel-making, the figures indicate a decided decrease in the use of scrap during the past year.

While in 1912 the production of Bessemer steel amounted to 10,327,901 tons, compared with 7,947,854 tons in 1911, the production for 1913 was only 9,545,706 tons, and it does not seem probable that the record for the production of Bessemer steel made in 1906, which was 12,275,830 tons, will ever be equalled. It should be noted, however, that included in the tonnage of basic open-hearth steel ingots and castings produced in 1913 are 2,210,718 tons of duplex steel ingots and castings made partly in Bessemer converters and partly in open-hearth steel furnaces. This is an increase of 772,064 tons compared with 1912. That the Bessemer process is holding its own pretty well is shown by the fact that on Dec. 31, 1913, there were 110 plants equipped to make steel by the standard Bessemer process or some of its modifications, as compared with 102 plants on Dec. 31, 1912.

Facing the Facts

A HIGHLY esteemed friend of THE IRON TRADE REVIEW writes us as follows:

"Isn't it possible to work up a little 'sikological' atmosphere from an optimistic standpoint? 'Fax is fax' I know, but sometimes we forget recent and existing conditions. Perhaps the enclosed will give you my drift."

The clipping sent by our friend is an editorial published by the *Manufacturers' Record* several months ago. This editor argues that the natural wear and tear and the necessities of the American people will keep business going to some extent. "And," the editor adds, "any idea that the business world is coming to an end, that we must sit around with our thumbs in our mouth and wonder how soon the undertaker will be ready for us is unworthy of a man." Finally the editor advises that the demagogue or agitator against legitimate business be taken by the back of his neck and that other more or less violent things be done to him. "Then," says the editor, "go ahead and in the great drama of business life, act well your part; there all the honor lies."

This is very fine, but the business men of this country have not been sitting around dolefully. They have been meeting distressing business conditions with great courage and rare wisdom. They have reduced production because they were compelled to do so, but they have done it most carefully and with the greatest consideration for their employes. As many men as possible have been kept busy at least a part of the time and wages have not been reduced except when it was imperatively

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demanded by the interests of the companies.

THE IRON TRADE REVIEW believes in optimism and cheerfulness, but it is utterly opposed to manufacture sentiment which is not justified by actual conditions. Some men and some newspapers seem to think that prosperity can be forced to return by lying about present conditions. For example, many newspapers recently published a story about the prosperity of the Pennsylvania railroad. *The New York World* had an article headed, "Business Boom On; Pennsylvania Railroad Orders 1,000 Cars, 81 Engines; Thousands of Additional Men Employed in Altoona Shops with Assurance of Permanent Work". The article went on to say that every department of the Altoona shops was working full time, with many of the departments working overtime.

In order to ascertain the truth as to the newspaper stories, we addressed a letter to Ivy L. Lee, executive assistant in charge of the Pennsylvania Railroad Co.'s publicity work. Mr. Lee replied that "in the Altoona car shops on new work, 60 per cent of the normal force is working 55 hours per week, 60 hours being a normal number; in Juniata locomotive shops, 60 per cent of the normal force is working 55 hours per week, 60 hours being a normal number; in the foundries, 70 per cent of the normal force is working 40 hours per week, 60 hours being a normal number; while 70 per cent of the normal force in the shops on maintenance work is working but 40 hours a week. Furthermore, in our operating department we made an additional reduction in forces in June of 1,500 men."

The World stated that an order had just been placed at the car shops for 1,000 all-steel box cars. Mr. Lee says that the truth is that the 1914 equipment program of the Pennsylvania railroad called for 2,050 all-steel box cars. This program was approved in March, at which time the orders were given and the car shops are now working on these cars. No new orders have been placed. *The World* article also asserts that some months ago about 1,200 men were laid off, but that in the last ten days practically all these men had returned to work, and, in addition, mechanics had been employed from other cities. Mr. Lee states that there is no truth in this statement.

Probably *The World* was imposed upon by correspondents, but it looks very much as if someone has been trying to point a rosy picture at the expense of truth. If prosperity could be manufactured by falsehood, it would be a house built upon sand. The best way to meet present conditions and solve problems, so that business can be established on a basis of permanent prosperity, is to look the facts squarely in the face.

The Non-Binding Contract

THE steel industry is again in a contracting period. Buyers, particularly the larger interests, are closing for their estimated requirements for six months or a year ahead. Considerable business of this character has been booked and the increase of 34,000 tons in June in the unfilled tonnage of the United States Steel Corporation, representing a net change of approximately 300,000 tons over the preceding month, may be attributed largely to these dealings in futures.

A contract in the steel trade in this country, notoriously is a bad one for the producer, because it does not mean what it says, as far as the purchaser is concerned. Volumes have been written upon this subject and many high-sounding declarations have been made by the manufacturers that this deplorable condition is to be changed by the enforcement of exact terms. Some progress has been made, but the fact remains that the non-binding contract for the consumer still obtains. There is no doubt that some larger consumers must be protected for months ahead at a fixed price, inasmuch as their manufacturing is not shaped to present demand, but to a prospective market considerably in the future. It is difficult to explain, however, why it is necessary to accept contracts a year ahead. The element of uncertainty in such cases must of necessity be so great that to do so cannot be justified as good business.

Through long-established practice, the steel makers of this country deliberately are putting themselves to a disadvantage in this way. It would be much better for the stability of the whole trade were a fixed term for contracts —say three months, generally, and six months in some cases—be adopted and vigorously enforced. Then, it would be possible to determine whether the tonnage on the books of makers is genuine business or mere options against which specifications may or may not be given.

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for July, 1913. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for June, 1914.	Average for April, 1914.	Average for July, 1913.
Bessemer pig iron, Pittsburgh..	$14.90	$14.90	$14.90	$16.65
Basic pig iron, Pittsburgh.....	13.90	13.90	13.90	15.25
No. 2 Fdy. pig iron, Pittsburgh	13.90	13.90	14.15	14.75
Northern No. 2 Fdy., Chgo.....	14.00	14.25	14.25	15.05
Lake Superior Charcoal, Chgo..	16.00	15.75	15.50	16.75
Malleable Bessemer, Chicago...	14.00	14.25	14.25	14.85
Southern No. 2, Birmingham...	10.00	10.37	10.43	10.45
Southern Ohio No. 2, Ironton..	13.25	13.50	13.50	14.20
Basic, eastern Pa.....	14.25	14.00	14.25	15.25
No. 2X Virginia furnace.....	12.75	12.75	12.75	13.00
No. 2X Foundry, Philadelphia.	14.75	14.75	15.00	15.50
Ferro manganese, Baltimore....	37.50	38.00	38.50	58.50
Bessemer billets, Pbgh. & Ygn..	19.00	19.75	20.80	26.50
Op. h'th sh. bars, Pbgh. & Ygn.	20.00	20.75	21.60	27.50
Bess. sheet bars, Pbgh. & Ygn..	20.00	20.75	21.60	27.50
Op. h'th billets, Pbgh. & Ygn..	19.00	19.75	20.80	26.50
Steel bars, Pittsburgh.....	1.10	1.11½	1.15	1.40
Iron bars, Philadelphia.....	1.17	1.17	1.22	1.47
Steel bars, Chicago.....	1.28	1.29	1.38	1.58
Tank plates, Chicago.....	1.28	1.28	1.32	1.63

	Today's prices.	Average for June, 1914.	Average for April, 1914.	Average for July, 1913.
Structural shapes, Chicago.....	$1.28	$1.28	$1.35	$1.63
Iron bars, Cleveland, local del'y	1.20	1.20	1.25	1.56
Iron bars, Chgo. mill.....	1.05	1.10	1.15	1.50
Beams, Pittsburgh	1.10	1.11½	1.18	1.45
Beams, Philadelphia	1.25	1.25	1.30	1.60
Tank plates, Pittsburgh.....	1.10	1.10	1.15	1.45
Tank plates, Philadelphia.....	1.25	1.25	1.30	1.65
Sheets, blk., No. 28, Pittsburgh.	1.80	1.82	1.92	2.25
Sheets, blue an., No. 10, Pbgh.	1.35	1.35	1.40	1.72
Sheets, galv., No. 28, Pbgh.....	2.75	2.80	2.92	3.32
Wire nails, Pittsburgh.....	1.50	1.50	1.60	1.70
Connellsville fur. coke, contr...	1.85	1.75	2.00	2.50
Connellsville fdy. coke contr....	2.40	2.35	2.50	3.00
Heavy melting steel, Pbgh.....	12.00	12.00	12.00	12.50
Heavy melting steel, east'n Pa..	10.50	10.75	11.00	11.50
Heavy melting steel, Chgo.....	9.50	9.75	9.50	10.50
Heavy cast, eastern Pa.....	12.50	12.50	13.00	13.25
No. 1 wrought, eastern Pa.....	12.00	12.50	13.00	14.25
No. 1 wrought, Chgo.....	9.00	8.88	8.50	10.50
Rerolling rails, Chgo.....	11.25	11.25	11.25	12.00
Car wheels, Chgo.....	10.75	11.25	11.00	17.00

(For Additional Prices See Page 182.)

Heavy Sales of Pig Iron at Buffalo

Aggregating During the Past Three Weeks 150,000 Tons—Basic from a Lake Furnace Will Be Shipped To Kokomo

New York, July 21.—Coincident with the firming up of Buffalo pig iron prices from $12.50 or lower to $13, furnace, for No. 2X, details regarding a very heavy selling movement out of that territory, since about July 1, much of it quietly done, now have become known. Reliable information indicates that the total sales of Buffalo producers during the past three weeks or so have aggregated easily 150,000 tons, with the indication that this figure has been exceeded. Included in this tonnage are some blocks previously referred to in The Iron Trade Review reports. Among the larger transactions were 25,000 tons to the American Radiator Co., 30,000 tons to the New York Car Wheel Co. for the New York City tunnel segments, upwards of 10,000 tons to the Malleable Syndicate, and 10,000 tons to the General Electric Co. There has been a heavy sale of Buffalo iron in the metropolitan district and in New England. Much of the business is said to have been taken at $12.50, furnace, for No. 2X, but there appears to be no question that this figure was cut considerably in some cases. Today, the Buffalo furnaces are well filled on orders and the market there is firmer than for some time. The influence of active Buffalo selling apparently brought out lower prices from eastern Pennsylvania producers, as No. 2X from that district has been selling at $14.25 to $14.40, delivered Jersey points. The General Electric Co. is inquiring for 9,600 tons additional of foundry grades for last quarter, including 2,700 tons for Pittsfield and 1,000 tons for Lynn, both high silicon, a small lot for Erie and the remainder for Shenectady. New England has been buying more actively largely for a part of the Buffalo movement. Sales include 1,500 tons to Lowell, Mass., and 1,000 tons to Whitinville, Mass., buyers. A Westfield, Mass., shop wants 3,500 tons of high phosphorus and an Elizabeth buyer 1,000 tons of Nos. 2 plain and 2X. A soil pipe maker, this district, has been buying some iron and a Newark hoisting equipment maker recently took about 1,000 tons. Other sales in this territory include 1,000 tons of malleable, which went to a New York State maker, and lots of 2,500 and 1,000 tons of low phosphorus to Lebanon furnaces.

Virginia Iron Weakens

Philadelphia, July 20.—A more pronounced weakening of the Virginia market has been about the only incident of interest in a week of general dullness in pig iron at Philadelphia and vicinity. Virginia iron for last half dropped more squarely to $12.50, furnace, for No. 2X, several lots being reported upon this basis, including two sales of 500 tons each at $12.50. Virginia No. 2X is quoted at $15.30 to $15.50, delivered this city, or $15.25, delivered after the reduced freight rate recently ordered goes into effect, and at this figure remains 50 to 75 cents out of line with northern irons. One resale lot of 1,000 tons or more of Virginia No. 2X is being offered in this territory at concessions. Virginia producers are much dissatisfied with the situation because of the low prices and the Princess stack will go out soon for relining. Other furnaces now blowing there are two Virginia Iron, Coal & Coke, Low Moor, Pulaski, Oriskany and Allegheny. Virginia furnace stocks have been increasing. Northern irons have had a slow week. Small sales and inquiries prevail. Some brands of Pennsylvania No. 2X are available at $14.50, Philadelphia, but the usual price is $14.75. Cast iron pipe makers, as usual, are buying some low-grade and off-cast lots at about $13.75, delivered. One sale of slightly less than 1,000 tons is noted. There is no demand for mill. Forge and basic are stagnant. The Lenoir Car Works, Lenoir City, Tenn., asks 450 tons of

(*For complete prices see page* 182.)

prompt southern No. 2 and forge. A sale of 1,000 tons of malleable is reported. An eastern buyer took 1,000 tons of low phosphorus from a Lebanon district maker at quoted prices and the General Electric Co. is negotiating for this grade. Sales of standard low phosphorus are light.

Will Not Admit Large Sales

Buffalo, July 21.—The merchant stacks in the Buffalo district are adhering to $13 as the minimum prices in making quotations on iron for current or contract needs. Aside from a scattering inquiry the market situation remains about the same as reported a week ago.

While it is generally understood that orders have been booked by Buffalo furnaces for needs in the east, particularly in the coast and New England section, aggregating 150,000 tons in the past several weeks, the local producers are loath to admit having made sales to this extent. The pig iron interests have not taken on as yet the attitude of optimism which has developed among the mills and agencies handling the finished materials.

Pittsburgh Pig Iron Prices Unchanged

Pittsburgh, July 21.—There has been no change in the pig iron market at this center or in the valleys this week, although dealers appear to be more hopeful about the future than 10 days ago. Improved sentiment, however, apparently is the result of some intangible influence, for no trace of any actual change in the situation can be found. Prices show no strength, and iron is being offered at current quotations for delivery the remainder of the year. Talk of a couple of idle blast furnaces resuming operations is heard.

Basic for Kokomo

Cleveland, July 21.—The most important transaction negotiated in a Cleveland office for some time was the purchase of 15,000 tons of basic pig iron for last half delivery by the Kokomo Steel & Wire Co., Kokomo, Ind. The iron will come from a lake region blast furnace and it is understood the price was about $13, furnace. The few furnaces now in blast along the lakes are in pretty fair condition as to stocks and the shipments are about equal to the make.

Sales Increasing

Chicago, July 21.—Pig iron sales are increasing as a result of a more earnest inquiry for foundry and malleable grades. This does not mean the volume of business is such as would be normal for a buying movement at this season, but it is so much larger than dealers have been handling in previous months it gives the semblance of much activity to the market.

Some users of basic are simply "rubbering" at the market and apparently do not care to buy even at present prices. Curiosity is expressed at the large purchases of one user of basic in this territory who has taken large tonnages for immediate delivery and is rumored to stand ready to take any quantity at the price the former purchases brought.

A sale of 500 tons of malleable to a melter in northeastern Illinois has attracted much attention. It was not placed with Chicago makers and is said to have brought $14.35, delivered, which would have figured $13.50, Chicago furnace. The rate from the nearest furnace east is $1.70, which makes an unusually low price at the furnace.

Unquestionably a large increase in bookings has taken place and the inquiry is broader and more sincere than for some time. Demands for coke also are quickening and larger quantities are being shipped by a number of dealers, indicating an increased melt.

Chicago makers of pig iron hold firmly to $14, Chicago furnace, for No. 2 foundry and malleable and are booking orders at that level for last half.

Southern foundry is held at $10.25, Birmingham, and sales are being made on that basis in increasing volume. One dealer has booked more in July than in January, the latter being the best month of the year to July 1. The Sandwich Mfg. Co., Sandwich, Ill., is inquiring for 2,000 tons of foundry iron.

Good Business Closed

Cincinnati, O., July 21.—One local dealer has closed a large volume of business during the past week at prices varying from $10.25 to $10.50, Birmingham basis, for No. 2 foundry for the last half, and $10, Birmingham basis for prompt shipment. Other dealers report scattering orders, which are generally light in tonnage. A Louisville, Ky., melter has purchased 1,500 tons of southern No. 2 foundry for the last half and another lot of 1,000 tons of southern foundry has been sold in the Louisville district. The Kokomo Steel & Wire Co., Kokomo, Ind., recently closed for from 15,000 to 18,000 tons of basic iron at $14.40, delivered. The contract was secured by a lake furnace.

Southern Ohio basic iron is obtainable at $13, Ironton basis. Foundry grades from this district are unchanged at $13.50, Ironton basis, for No. 2 foundry. Southern iron for prompt shipment is quoted at from $10 to $10.25, Birmingham basis, for No. 2 foundry and from $10.25 to $10.50 for third quarter and last half shipment.

Small Inquiries Pending

St. Louis, July 20.—The only inquiry of consequence for pig iron in the St. Louis market is one for 1,000 tons of northern and southern, mixed, from a large concern in Dubuque, Ia., although there is a fair tonnage of small inquiries. Several scattering car lots were sold last week. Southern No. 2 is freely offered at $10.25, Birmingham. Northern iron is quoted at $14, Chicago furnaces, and $13.50, Ironton.

More Sales at Birmingham

Birmingham, Ala., July 20.—Apparently more pig iron has been sold the past week than the week previous in this district, but no large sales have been consummated. An estimate of 45,000 or 50,000 tons, it is believed, would cover the week's total sales. The prevailing quotation for southern No. 2 is $10.25 for spot delivery, while $10.50 is being asked for fourth quarter delivery and in one or two cases, $10.75.

Buyers, it is claimed, appear cautious and backward and seem to think they should be getting iron at $10. Furnace men, however, are optimistic and express the belief that the beginning of increased trade and stiffer prices is at hand.

Tin Plate Quiet

Pittsburgh, July 21.—Some tin plate manufacturers are beginning to develop business for next year, but, generally speaking, negotiations for 1915 needs will not be opened until autumn. Interest is taken in the consolidation of the Wheeling Sheet & Tin Plate Co., which owns a 10-mill tin plate plant at Yorkville, O., with the Wheeling Steel & Iron Co., Wheeling, W. Va.

The sale of the New Haven Machine Screw Co., New Haven, Conn., to L. G. Richards and Fred Bartlett of the Universal Machine Screw Co., New Haven, has been confirmed by a court order, the price of the plant to be $38,500. The creditors of the New Haven company are to receive 50 cents on the dollar on their claims.

(*For complete prices see page* 182.)

Better Sheet Demand

In Chicago District--Activity in the Eastern Market Maintained

Cincinnati, July 21.—Demand for sheets has increased in this territory and the tonnage booked last week was in excess of that of the week previous. The present week has begun with encouraging business, and from all appearances will be as good as last week. Orders are limited mostly to small tonnages, but are numerous and are coming from all parts of the country. Some mills are beginning to show a disposition not to book too large a tonnage at present prices, which are too low for a fair profit. Two large mills are not running this week, but one of them, the Portsmouth Steel Co., at Portsmouth, O., will re-open in full on July 27. Galvanized sheets No. 28 gage are quoted at from 2.85c to 2.95c, black sheets No. 28 gage at from 1.90c to 2c, and blue annealed No. 10 gage at from 1.50c to 1.55c, all Cincinnati basis.

Demand at Chicago Greater

Chicago, July 21.—Users of steel sheets seem to have come to the conclusion that they cannot buy cheaper than present prices and orders are coming more briskly than has been the case for some time. Inquiry has a better tone and prices are accepted with less haggling than formerly. Some mills are booked ahead sufficiently to have a much more comfortable outlook than for months, but prices so far have not been stiffened above the level of the past month.

Quotations are 1.98c to 2.03c, Chicago mill, for No. 28 gage black and 2.93c to 2.98c, Chicago mill, for the same gage galvanized.

Slightly Firmer

Cleveland, July 21.—There are indications that sheet manufacturers will not continue to sell at present low prices and there is slightly more firmness in the market. Demand is, however, limited and not strong enough to show what could be done on a good tonnage.

Activity Reported in Sheets.

Pittsburgh, July 21.—Some of the leading manufacturers in western Pennsylvania and eastern Ohio report improved demand for all grades of steel sheets, and one of the larger interests has sold material for extended delivery at from $3 to $5 a ton above present quotations. Consumers show a greater disposition to cover needs than a few weeks ago, but there has not been enough selling to fill up all the mills or to benefit quotations, which are still low. Operations are unchanged.

Eastern Activity Holds

Philadelphia, July 20.—Increased activity in the eastern sheet market is maintained. The leading producer in this district is running its mills full and is keeping up its order book. Several eastern buyers have been placing moderate orders for stock. Present prices of 1.50c, Philadelphia, or 1.35c, Pittsburgh, for No. 10 gage, prevailing in the eastern market seem satisfactory to consumers and their efforts to obtain lower figures are less pronounced. Some contracting is being done, usually for third quarter.

Plate Market

In Chicago District Benefited By Increased Car Buying

Chicago, July 21.—Increased buying of cars has assisted the plate market somewhat, and this effect has been aided by larger demand from other lines of manufacture. Indications warrant the assumption that buyers of steel generally who have been holding off in the hope prices would sag further have come to the conclusion that present levels are bedrock and believe they would better buy now before the present movement assumes such proportions as to cause an increase.

Quotations for plates remain at 1.28c, Chicago, for prompt shipment and 1.33c, Chicago, for fourth quarter. Locally some tonnages of size and attractiveness may be had a shade lower, 1.25c, Chicago, being observed.

Carnegie Advances Plates

Pittsburgh, July 21.—As announced elsewhere under a Pittsburgh date line, the Carnegie Steel Co. has withdrawn all quotations on plates, shapes and bars below 1.15c. Demand for steel plates is just about keeping pace with that in June, which showed moderate improvement over May.

Plates Slow in East

Philadelphia, July 20. — Eastern Pennsylvania plate makers still see little to encourage them in present conditions. There is but little life to their market and the run of business is of a mixed and unsatisfactory character from an operating standpoint. Contracts are being avoided rather than sought at ruling prices.

Low Price Vanishes

Buffalo, July 21.—The 1.10c base price has disappeared. All interests represented here are now asking 1.15c and report a number of inquiries coming in.

Billet Buyers

Are Slow To Contract in Eastern Pennsylvania Territory

Philadelphia, July 20.—A Lebanon, Pa., buyer has placed 1,200 tons of small wire rods with mills in the Pittsburgh district and still figures on 600 tons of special billets. Consumers of billets and semi-finished steel in eastern Pennsylvania territory still are backward to enter into contracts and are offering only a moderate tonnage for early delivery. One leading eastern billet maker is not pushing sales because of the low prices prevailing and is practically out of the market. Rolling steel remains $21.90, Philadelphia, or $19.50, Pittsburgh, and forging steel is $4 to $5 higher.

Billets Off a Notch

Pittsburgh, July 21.—Some consumers of billets and sheet bars have definitely indicated that they intend to increase specifications as the year progresses and increased reservations already have been made. The market continues quiet, but frequent expressions are heard that desirable lots of billets can be obtained at $19, mill, or 50 cents a ton under the market of 10 days ago. Several attractive wire rod tonnages have been sold at about $24.50, Pittsburgh.

Ashland Steel Operating

Ashland, Ky., July 21.—The Ashland Steel Co. resumed operations on July 20 in all departments, after a short shutdown for alterations and repairs. The feeling in this territory is more optimistic, but business shows very little improvement. Billets are quoted at $20, and wire rods at $25, both Ashland basis.

The Alaska Freezer Co., Wichendon, Mass., has taken over the business of the Dana Mfg. Co., Cincinnati, and is moving the plant of the latter to Wichendon. The new concern will double the business of the Alaska Freezer Co. and as soon as the newly acquired plant is installed the whole concern will work under the name of the Peerless Freezer Co.

(*For complete prices see page* 182.)

Bumper Crops Help Wire

July Specifications of American Steel & Wire Co. Very Heavy—Price Advanced

New York, July 21.—The advance of $1 a ton in wire products announced July 18 by the American Steel & Wire Co. and independent makers, is the result of an active demand from the merchant trade, much of which may be attributed to the influence of the bumper crops. Manufacturing consumers are not doing nearly so well and their orders are moderate. July specifications with the American Steel & Wire Co., to date, have been exceeded only slightly by a similar period in but two previous years. Eastern jobbers since the latter part of June have enjoyed a better demand and show more cheerfulness regarding the business outlook. The new prices for wire in railroads to jobbers are 1.55c, Pittsburgh, for nails, and 1.35c for plain wire. Birmingham prices are 1.70c, for nails, and 1.50c for wire. Wire rods are now $25.50, Pittsburgh.

Wire Up a Peg

Pittsburgh, July 21.—On Saturday, July 18, the American Steel & Wire Co. advanced quotations $1 a ton, and leading makers now are quoting nails on the basis of $1.55, and plain fence wire at $1.35. Woven wire fencing was not changed. Makers advise that new business has been coming out in better volume and specifications have increased moderately.

Optimism Prevails

Cleveland, July 21.—It is not expected that there will be any considerable business in wire and wire nails for some time, as many contracts were entered into before the recent price was announced. Very optimistic feeling prevails in wire circles.

Wire Prices Are Advanced

Chicago, July 21.—Prices on wire and wire products have been advanced by the leading interest $1 per ton, the schedule now being $1.55, Pittsburgh, for nails and $1.35, Pittsburgh, for wire, to jobbers, with the usual differentials for shipments to retailers.

Better Demand

Demand for wire and nails has been increasing recently, in spite of the summer season, the call coming from users of wire in many lines of manufacturing over a wide area. Rumors of the impending advance has stimulated business the past fortnight, as users sought to get under cover before the increase.

Coke Inquiry

Comes from the East—Reading Iron Co. Buys

Philadelphia, July 20.—The United Gas Improvement Co., Philadelphia, is in the market for the annual requirements of 48-hour coke for its various gas plants in different parts of the country. These requirements total about 50,000 tons. The Reading Iron Co., which has been figuring on 20,000 tons of furnace coke, has placed this business with a Pittsburgh dealer. This buyer sought a price below $1.75, ovens, and it is not learned what price it actually paid, though it was not interested in a quotation of $1.75, ovens, for early delivery. A price of $1.85, ovens, for last half was rejected by it.

Connellsville Coke Dead

Pittsburgh, July 21.—The Connellsville coke market has been decidedly dull for a month, during which quotations have appeared to be somewhat uncertain. Some furnace coke for August delivery has sold at $1.75, ovens, but a few operators continue to ask $2. Foundry coke has been fairly active; spot foundry has sold as low as $2.25, but leading dealers are asking $2.50 for future shipment. The *Connellsville Courier*, for the week ending July 11, says production was 264,605 tons, an increase of 4,353 tons over the week before. Shipments the first half of the year aggregated 8,150,000 tons, the *Courier* says. At the rate of output the first half of the year, production for 1914 will be about 15,000,000 tons.

Lull in Contracting

Cleveland, July 21.—Cleveland foundries which have been actively contracting for coke during the last few weeks have nearly all covered as fully as they wish to do at the present time and there has been very little activity during the past week.

Sales Limited at Cincinnati.

Cincinnati, O., July 21.—Sales of foundry coke are limited to belated orders from a few melters who have neglected to close, or who have had enough coke left over from last year's requirements to run them up to the present time. Furnace coke is very inactive, as the majority of furnaces in southern Ohio have blown out or banked or are well supplied. Prices are unchanged in all districts.

Very Little Demand

St. Louis, July 20.—There is very little demand for coke in the St. Louis market, with foundry grades ranging from $2.50 to $2.75.

Offer Ferro

For Next Year's Delivery—Inquiry from Colorado

New York, July 21.—Some inquiry for ferro-manganese for delivery in 1915 has appeared in the market, including 5,000 tons for the Pueblo, Col. consumer. Another inquiry for 700 tons for the same delivery for a middle western consumer, to be delivered after Jan. 1, 1915, is out, and several other similar matters are in view. In some cases these inquiries have been developed by the solicitation of sellers, who now are able to offer material at $38, seaboard, for next year's delivery, or at the same price as for this year. Many consumers, with large tonnages purchased for this year, which they are unable to take out fully because of reduced operations, are not interested in new purchases so far ahead. In a number of cases, sellers are being asked to withhold shipments against these contracts. Sales of ferro-manganese reported aggregate about 500 tons for early delivery, including one lot of 200 tons, which went to German makers at $37, seaboard, and several hundred tons additional, which were taken both by German and English makers, the latter at $38, seaboard.

Ferro Alloy Inquiry Light

Pittsburgh, July 21.—Demand for ferro alloys at this center is light. All grades of ferro silicon have displayed slight weakness recently, although there has been no formal change in quotations.

Distressing Conditions on the Lakes

If any change has taken place, lake trade is in worse shape than it was a week ago, which is equivalent to saying that it is completely demoralized. Hope is abandoned that it will get any better until the fall crop begins to move. The ore trade is scarcely taking care of the shippers' own tonnage. There is little inquiry for ore. Furnacemen are slow in placing orders and indifferent as to the delivery of ore for which orders were placed some time ago.

(*For complete prices see page* 182.)

Scrap Moves Very Slowly

In Eastern Pennsylvania and Market Drags in Nearly All Centers

Philadelphia, July 20.—Sellers of old material still find great difficulty in interesting buyers in eastern Pennsylvania except at the latters' own figures. Heavy melting steel offered by dealers this week at $10.50, delivered, brought no response. No. 1 railroad wrought is especially hard to move and $12, delivered, appears the top for this grade. Wrought pipe has done better, one buyer taking several lots at $10, delivered, including, it is reported, a block of more than 1,000 tons. Small lots of car wheels have been sold at slightly over $11.25, delivered. The highest price obtainable on No. 1 heavy cast, and this under conditions, has been $12.50, delivered. Italy, which usually is a buyer of material from this country at low prices, is out of reach, as its home market now is almost as depressed as that prevailing in eastern districts.

Better Undertone

Buffalo, July 21.—Dealers in the Buffalo territory report a better undertone to the entire market. There is a strong demand for turnings and borings. There is a good amount of inquiry for heavy melting steel and for No. 1 busheling scrap.

Opinions Differ

Pittsburgh, July 21.—The scrap market has been almost too lifeless to offer anything of interest concerning quotations, and buyers and sellers do not agree about the status of the market. Best grades of heavy melting steel are being held at $12.

Very Light Demand

Cleveland, July 22.—The iron and steel scrap continues in extremely light demand. Dealers claim to note some improvement in sentiment, but state actual business is showing no increase in activity. Supplies are growing large and will serve to act as more or less a depressing agent when the upturn does come. Heavy melting steel continues quotable at about $10 to $10.50 and other prices are unchanged.

Dealers Make Concessions

Cincinnati, July 21.—Dealers are making concessions on all grades of iron and steel scrap in an attempt to induce buying, but have been unsuccessful, principally because no material is needed by dealers in this territory at the present time. A large number of users are barely operating and some have closed down indefinitely, either because of lack of orders or for alterations and repairs. Embargoes have also been declared against shipments of scrap to several large mills. The market has been exceedingly inactive during the past week and business done during the first part of the present week has been about as light as it is possible for it to be. No changes in quotations are reported.

Firmly Pegged

Chicago, July 21.—Scrap iron and steel in this market are most laggard. Prices are at a standstill without strength and so little tonnage is being moved there is no incentive to cut quotations to lower levels. The result is stagnation. Some of the larger consumers have filled their reserves at low prices and are not buying except to keep even as the scrap is used in their lessened operations. Sentiment is equally weak.

Railroad offerings have fallen off and only two lists are before the trade, the Burlington and the Union Pacific each offering 1,800 tons.

Better Feeling

St. Louis, July 20.—There is a much better feeling among scrap dealers in the St. Louis market, with a tendency to a strengthening of prices. List out today to be closed this week are: Clover Leaf railroad, 200 tons; M., K. & T., 2,000 tons; C., B. & Q., 1,800 tons.

Cast Pipe

In Good Demand in South, But Prices Are Low

Birmingham, Ala., July 20.—Cast iron pipe makers in the Birmingham district have developed considerable activity in the past week or so, some good orders being received. Prices are low, however. It is stated that some orders have been placed for 4-inch water pipe at $19.50, Birmingham basis.

Information here is that the United States Cast Iron Pipe & Foundry Co. has received an order for 5,000 tons of the 12,000-ton government order of pipe for Panama. It had been reported that this company would probably receive the entire order. Officials here decline to make public the price quoted on the 5,000 tons.

The National Cast Iron Pipe & Foundry Co., of which F. I. Tarrant has just been elected president to succeed A. H. Ford, resigned, has announced that a new pit will be placed in service at once, thereby nearly doubling the output of the plant. This action is due to the receipt of a large batch of orders, it is said, and it is further stated that additional pits will be placed in service by this company in the near future. A. H. Ford, the retiring president, has moved to Portland, Me. He was also president of the Birmingham Railway, Light & Power Co.

Small Sales

Chicago, July 21.—Practically no sales of cast iron pipe were made the past week outside of routine business. However, a number of projects are in prospect which promise better business. Bids will be opened this week at Cincinnati for about 6,500 tons, at Decatur, Ill., for 150 tons; Frankfort, O., 200 tons; Hibbing, Minn., 100 tons; Bingham Canyon, Utah, 220 tons; Toledo, O., is taking bids on 5,000 tons.

Tubular Goods Unchanged

Pittsburgh, July 21.—Pending inquiries for line pipe for shipment to oil and gas fields have not been closed and no new negotiations of consequence have been opened, so far as is known. Boiler tube discounts, for both iron and steel grades, are irregular and uncertain.

Warehouses Book Orders

Chicago, July 21.—Warehouses in Chicago continue to book a larger business than earlier in the year and prospects for the late summer and fall are better than had been expected. Construction work has been active and calls for materials are continuing.

Low Price on Hoops

Cincinnati, July 21. — Warehouse business is fair and is unchanged in comparison with that of last week. Structurals have strengthened a little, but have not advanced in price. Hoops are now being offered generally at 1.80c, Cincinnati, which is considerably lower than quotations in surrounding territories. No changes in prices are reported.

(*For complete prices see page* 182.)

Steel Bars More Active

Agricultural Implement Makers and Railroads Prominent in the Buying

Chicago, July 21.—Buyers of steel bars from nearly all classes of users are coming into the market more actively and contracts and specifications are increasing. At present prices, the effort is being made to cover for long periods, but such orders are accepted only at advances for last quarter and first half.

Agricultural implement makers continue to contract and it is estimated the larger number of users have covered, but as the heavier buyers are still not covered, it is not believed the heavier portion of the tonnage is contracted. Railroads are coming into the market more liberally and also users in various lines of manufacture.

Bars are quoted at 1.28c, Chicago, for immediate specification, 1.33c for last quarter and 1.38c for first half.

Railroads Buy Bars

Philadelphia, July 20.—Leading eastern and southeastern railroads, including the Pennsylvania, Baltimore & Ohio and Norfolk & Western, have closed with middle western makers for their last half requirements of steel bars. The tonnages taken are considerably less than the normal total for six months, but they aggregate probably 15,000 to 20,000 tons. Some smaller bar contracts also are being taken in this territory. Specifications continue to run a little better. A Schuylkill valley steel maker has been placing some lots of rivet rods and is inquiring for 840 tons to conform to elevated railroad specifications in New York City, where it is executing a contract for structural steel.

Iron Bars Hold Own

Chicago, July 21.—The situation as to iron bars has not changed materially and sales are being made all the way from 1.05c, Chicago mill, to 1.10c. Demand is such as to keep mills operating at about the same schedule as earlier in the summer, but there is not much sentiment to strengthen the market materially.

Bar Steel Up; Bar Iron Down

Pittsburgh, July 21.—Effective today, the Carnegie Steel Co. has withdrawn all quotations of plates, shapes and steel bars below 1.15c, and several independent makers have followed suit. Demand has not improved, but it is apparent that makers are anxious to establish the market on a more remunerative level. Bar iron has sold at 1.20c in this territory, or $1 a ton under the previous market, and reports are heard of that figure being shaded. Heaviest consumers have covered third quarter requirements, and many of them are under cover for the remainder of the year.

Covered Before Advance

Cleveland, July 22.—Interest has centered during the past few days in the action of the Carnegie Steel Co. and some of the larger independent concerns in withdrawing the 1.10c quotation on shapes, plates and bars. While it is believed that all of the independents will follow the lead of the larger companies in asking $1 per ton more for deliveries on which the quotation has been 1.10c, the action is not yet universal. Business immediately preceding the announcement of the advance was considerably heavier than for some time, because buyers eagerly took advantage of the opportunity to cover at the lower price. Mills were, however, conservative in making contracts.

Firmer at Buffalo

Buffalo, July 21.—Mills and agencies in the Buffalo district have withdrawn the 1.10c, base, price which has been obtainable for some time on practically any kind of satisfactory orders. All are holding firm at 1.15c, even where desirable specifications are offered at the lesser figure. The general impression prevailing here is that the buyers' market will in a short time pass over to the sellers' side, and all the interests are looking for trade developments from an optimistic angle.

Light Products Dull

Pittsburgh, July 21.—Demand for hoops and bands has not improved. The Carnegie Steel Co., which advanced prices of plates, shapes and bars $1 a ton today, is now listing bands at 1.15c, but the 1.10c has not yet disappeared. Hoops are nominally quoted at 1.25c. Cotton ties are unchanged in position. Cold rolled steel shafting is being freely offered at 67 per cent off list for future delivery by some makers.

New York Awards Heavy

Including Large Projects--Very Low Prices Made By Fabricators

New York, July 21.—Awards of structural steel in the metropolitan and close-by districts have been heavy the past week, totaling fully 30,000 tons. Several large projects were included, among them 9,350 tons for a subway terminal station in Newark, and 5,000 tons of additional third-tracking of elevated lines, this city. Apartment house tonnage is becoming more active and awards of this character ran about 3,500 tons. Eastern mills are getting a better tonnage of rolling orders out of the New York district and some of these are for customers who now more seriously are inclined to restore some of their depleted stocks. This is regarded as a hopeful sign. Fabricated prices reflect sharp competition. Some of the larger work was placed at around $48, delivered, while for third-tracking elevated lines, less than $39, delivered Brooklyn, was done.

Balancing Off Eastern Stocks.

Philadelphia, July 20.—Some orders to balance off stocks rather than to rebuild them still are being received by eastern Pennsylvania structural shape mills. These instances suggest that where sizes fall extremely low, they are being brought up to moderate proportion, but that buyers still lack the incentive or the disposition to carry normal stocks. Some eastern mills report a little better specifications; others state that there is little difference in tonnage between July to date and June. New awards in this and surrounding districts are heavier. The Pennsylvania Steel Co. will get about 6,000 tons for Philadelphia municipal piers.

Cleveland Building Projects

Cleveland, July 21.—A number of important building projects are pending in the Cleveland district, but the tonnage to be placed at an early date is not large. The newest project, that to erect a new 16-story mercantile and office building on the site of the Republic and Star theater buildings, will call for a large tonnage of steel, but there is no definite information

(*For complete prices see page* 182.)

available as to when the plans will be drawn. The plans for the Union National Bank building, which will require about 1,200 tons, will not be ready for four or five months. The contract for reinforcing bars for the Stearns factory will be let within a few days. It is expected that the contract for the Akron terminal building, Akron, O., will be awarded in three or four weeks. The tonnage for the Bingham warehouse is still pending.

Fabricators Take Small Jobs

Pittsburgh, July 21.—Fabricating shops have taken numerous small tonnages this week, but no contracts of consequence have been placed in this district. The Carnegie Steel Co. and leading independent manufacturers have advanced the price of structural shapes to 1.15c.

Advanced at Buffalo

Buffalo, July 21.—Practically a raise in price in structural has taken place in the past 48 hours. Mills and agencies in the Buffalo district have withdrawn the 1.10c, base, figure obtainable up to a few days ago and are now asking 1.15c, base, and even 1.20c, base, where the tonnages and the specifications are not desirable. The interests report a considerable amount of tonnage in sight and on the boards.

Dayton's New Hotel

Dayton, O., July 21.—Work on the new Miami hotel, which will cost about $1,000,000, will be begun in the near future. The required amount of stock has been sold after two years of negotiating, following the purchasing of a site at the northeast corner of Second and Ludlow streets, this city. Shortly after the lot had been secured and the buildings razed, the floods of March, 1913, caused a postponement of the work and made it necessary to change the plans of financing the enterprise. Plans had been prepared by a Cincinnati architect, but these were changed, and the present work, both architecturally and structurally, will be under the supervision of H. L. Stevens & Co., of Chicago. The amount of steel required will be about 2,000 tons.

New Court House at Cincinnati

Cincinnati, July 22.—Bids for the construction of the Hamilton county court house and jail, at Cincinnati, which will cost between $10,000,000 and $15,000,000, will be received until Sept. 1. Plans and specifications are on file in the offices of the auditor of Hamilton county, Ohio, at Cincinnati, and in the offices of Rankin, Kellogg & Crane, architects, of Philadelphia, who are in charge of construction. Bids will be received for the general construction, heating and ventilating, electrical work, elevator equipment and power plant. The amount of steel required is estimated at about 7,000 tons. It is planned to have the new building under roof in two years.

Will Build New Shops

The Queen & Crescent railroad will erect new shops and extend its yard facilities at Cincinnati, in which city is located its principal offices. The railroad company on July 17 acquired an entire square in Ludlow, Ky., directly across the Ohio river from Cincinnati, which at present comprises 38 houses and lots, and for which it paid $100,000. The entire tract must be vacated by Nov. 1, after which time the railroad will begin extensive improvements which will cost another $100,000, making the total cost of the shops and land about $200,000. The improvements will consist of new shops, increasing the yard limits, and other smaller additions to the present capacity.

Chicago Tonnages Small

Chicago, July 21.—Structural lettings in the west the past week were numerous but did not total a large tonnage, the projects for the most part being small.

Structural shapes remain steady at about 1.28c, Chicago, with less evidence of prompt delivery being contracted at 1.25c, Chicago, than formerly.

CONTRACTS PLACED

Third tracking of elevated railroads in Brooklyn, for New York Municipal Railways Co., 5,000 tons, awarded to McClintic-Marshall Co.

Addition to the Metropolitan Museum of Art, New York City, 1,800 tons, awarded the Hedden Iron Construction Co.

Y. M. C. A. building, Brooklyn, 3,000 tons, awarded Hay Foundry & Iron Works.

Terminal subway station, Newark, N. J., 9,350 tons, general contract awarded Hedden Construction Co.; fabricated steel work awarded Hay Foundry & Iron Works.

High school, Mountclair, N. J., 500 tons, awarded Hedden Iron Construction Co.

Municipal building, Waterbury, Conn., 800 tons, awarded Levering & Gerrigues.

Jacobs apartment, New York City, 500 tons, awarded Harris H. Ures Iron Works.

Apartment house at Eighty-sixth and West End avenue, New York City, 1,100 tons, awarded Hay Foundry & Iron Works.

Building for Amherst Agricultural College, Amherst, Mass., 900 tons, awarded Levering & Gerrigues.

Excelsior Life Insurance Co. building, Toronto, 1,000 tons, awarded to MacGregor, McIntyre & Co.

Apartment, New York City, for the McMorrow Realty Co., 500 tons, awarded Geo. A. Just.

Loft building, 63 West Thirty-sixth street, New York City, 600 tons, and apartment 43 to 47 East Sixty-seventh street, New York City, 400 tons, for Mordecai Realty Co., both awarded Hinkle Iron Works.

Building at 176th and Washington streets, New York City, for Trinity Church Corporation, 250 tons, awarded Brooklyn Structural Steel Corporation.

Warehouse for R. J. Reynolds Tobacco Co., Winston Salem, N. C., 800 tons, awarded to the Jones & Laughlin Steel Co.

Highway bridge, Nanticoke, Pa., 900 tons, awarded to the McClintic-Marshall Co.

Bridge at Nanticoke, Pa., 1,200 tons, awarded the McClintic-Marshall Co.

Elevated railroad work for New York Municipal Railway Corporation, 5,800 tons, awarded McClintic-Marshall Co.

Sand leaching plant, buildings, leaching and storage tanks for Calumet & Hecla Mining Co., 1,231 tons, to Riter-Conley Mfg. Co.

Salinas river bridge, Soledad, Monterey county, Cal., 305 tons, American Bridge Co.

Tamarack regrinding plant, Calumet & Hecla Mining Co., Calumet, Mich., 300 tons, American Bridge Co.

Flashboard framing, Anaconda Copper Mining Co., Great Falls, Mont., 286 tons American Bridge Co.

Deck girder spans for Chicago, Indianapolis & Louisville Ry. Co., at Bedford, Ind., 276 tons, Wisconsin Bridge Co.

Addition to United States Brewing Co. plant, Chicago, 243 tons, Hansell-Elcock Co.

Office building for Joseph Pulitzer estate at St. Louis, 233 tons, reinforced concrete.

CONTRACTS PENDING

Municipal piers Nos. 38 and 40, Philadelphia, 6,000 tons, Snare & Triest low bidder on general contract and steel work will go to Pennsylvania Steel Co.

Addition to Hotel Traymore, Atlantic City, N. J., general contract placed with Cramp & Co.; indications are concrete construction will be adopted, requiring about 1,000 tons of column cores and base girders.

Public bridge over Patapsco river, near Baltimore, 3,000 tons or more. Bids expected to be asked about Aug. 1.

First National Bank building, Durham, N. C., 300 tons; general contract awarded to the Geo. A. Fuller Co.

Larkin & Sangster, Seneca Falls, N. Y., low bidders. New York state barge canal, contract, 109, about 1,300 tons.

Lathrop, Shea & Henwood, Scranton, Pa., low bidders, general contract, New York state barge canal, contract, 118, about 900 tons.

Power house at Minette, N. Y., for Columbia Mills, Inc., 500 tons, bids asked.

Delivery shed for American Sugar Refining Co., Boston, 400 to 500 tons, bids asked.

The Miami Hotel Dayton, O., 2,000 tons, H. L. Stevens & Co., Chicago, in charge of construction. Cost of building, $1,000,000.

New Hamilton county, Ohio, court house and jail, Cincinnati; about 7,000 tons. Bids received until Sept. 1 on general construction, heating and ventilating, electrical work, elevator equipment and power plant.

Large Steam Turbine.—The Edison Electric Illuminating Co., Brooklyn, N. Y., has placed an order with the Westinghouse Machine Co. for what is said to be the largest steam turbine engine, of the single-unit type, that has ever been constructed. The engine will have capacity of 32,000 horsepower, and will be used for the generation of electric current to furnish light and power.

(*For complete prices see page* 182.)

Important Amendments

Made By Senate Judiciary Committee to the Clayton Omnibus Anti-Trust Bill

Washington, July 21.—With sweeping amendments, doing away with numerous drastic provisions and making more clear the wording, the Clayton omnibus anti-trust bill will be reported to the Senate tomorrow from the judiciary committee. One phase which has been eliminated much to the relief of the business world was the Clayton definition of "unfair practices". Labor exemption clauses, too, have been greatly modified, although the one legalizing labor organizations was retained after being slightly amended. It was expected this provision would stand as it left the House. It holds that such organizations are not to be construed as existing in restraint of trade. Section 18 is not expected to legalize "picketing" by representatives of labor unions on a strike.

The language of the House bill in the section which forbids the issuing of restraining orders or injunctions by federal courts in labor troubles is adopted down to the clause relating to picketing, except in one respect: In the language intended to prevent injunctions to restrain employes from quitting work or from recommending, advising or persuading others by peaceful means to do likewise, the qualifying words "whether singly or in concert" are inserted, this being held as a concession to labor unions. The Senate struck from this section the House language which was supposed to forbid an injunction against picketing and which was as follows: "Or from attending at or near a house or place where any person resides or works, or carries on business or happens to be, for the purpose of peacefully obtaining or communicating information." The House forbids an injunction against any one "from ceasing to patronize or to employ any party" to a labor dispute. The Senate committee changed this to read: "To forbid the issuance of an injunction to restrain one 'from withholding patronage from any party' to such labor dispute." This was the provision held to legalize the boycott and the blacklist.

Provision is made for court review of orders issued either by the Federal Trade Commission or the Interstate Commerce Commission. The Senate committee eliminated the penalties of fine and imprisonment provided by the House in the price fixing clause and substituted the injunctive relief in case of disobedience of an order entered by the Interstate Commerce Commission. The section is made a great deal more liberal. The Senate committee struck out the section requiring producers of fuel, electricity and power to sell the product upon application by any person or corporations desiring to purchase it for resale. Another part of the price-fixing section was slightly modified and instead of the provision being made for fine and imprisonment, relief is provided for by appeals to the commission and to the courts for injunctions. This section is aimed to prevent selling contracts or leases or licenses fixing a minimum price for resale and it was amended to cover patented articles. The House provision for civil action for damages for the anti-trust laws for persons who may have been injured on account of its violation is left unchanged.

Section 6 was re-written. It provides that a final judgment or decree in a suit or proceeding in equity on a charge of violation of the anti-trust laws shall be prima facie evidence against the defendant in any suit or proceeding brought by any other party, with the statute of limitations extending six years. The part of section 7 permitting traffic arrangements of common carriers was struck out. In section 8 the provision for fine and imprisonment was struck out and injunctive relief substituted.

An amendment to this section was added providing that nothing in the section shall operate to affect or impair any right heretofore legally acquired. The Senate committee also added a provision that the section should not be construed to legalize anything heretofore held to be unlawful under the anti-trust laws. The Senate rewrote Section 9, intended to prevent directors or officers of railroad corporations from being directors in other corporations supplying materials, equipments and other supplies. The Senate committee limits the amount of a purchase that may be made from such supply corporation to not more than $50,000 in any one year except by competition, following notice and publication under regulations to be prescribed by the Interstate Commerce Commission. The section retains the provision for fines and imprisonment for violations. A section was inserted providing heavy penalties for the president or other officer of a person or corporation engaged in commerce as a common carrier for theft of funds, presecution in the federal courts being provided.

Section 12 was rewritten. It provides a fine not exceeding $5,000 or imprisonment not exceeding one year for a director, officer or agent of a corporation which shall violate penal provisions of the anti-trust laws or who shall have been a party to such a violation.

Encouraging

Is New Business of Corporation—Increase in Active Capacity

New York, July 22. (By wire.)—An encouraging volume of new business and specifications continues to come to the United States Steel Corporation and some other large makers. July bookings and specifications with the Corporation remain considerably ahead of June and the present month is making one of the best records of the present year. Steel works operations have been expanded to 70 per cent, a gain of 5 per cent over last report. Three additional furnaces, one Carrie, one Duquesne and one Youngstown, are going in, making six stacks in all put on since the improvement began.

The new schedule of bars, shapes and plates announced by the Corporation is 1.15c prompt and third quarter, and 1.20c for fourth quarter.

Southern Iron More Active

New York, July 23. (By wire.)—Improved inquiry in both foundry and basic is reported from the southern market. Considerable selling of southern iron has been done by some makers during the past few days, which is reliably estimated in excess of 50,000 tons.

Advance Cement Price

The cement market in the territory lying, generally speaking, between Buffalo and North Dakota, the Great Lakes and the Ohio and Missouri rivers, has advanced 5 cents per barrel, from an average of about $1.05 to $1.10. This advance is brought about by relatively small stocks, good demand with excellent prospects.

Involves Large Tonnages

Pennsylvania Steel Co. Makes Important Contract With Valley Mold & Iron Co., Which Will Build Additional Plant

Philadelphia, Jauly 21.—The Pennsylvania Steel Co., this city, is about to conclude negotiations with the Valley Mold & Iron Co., Sharpsville, Pa., to furnish it direct metal from the Lebanon furnaces, at Lebanon, Pa., where the Valley Mold company will erect an additional ingot mold plant. Arrangements entered into are similar to those existing between the Valley Mold company and the Shenango Furnace Co., through which the latter furnishes the former direct metal for the ingot mold plant at Sharpsville. It is understood that the metal involved will be sold on a sliding scale, based at the furnace, which will enable the mold company to waive freight differentials in shipping molds to eastern consumers.

The proposed contract which has not been formally drawn and signed involves a long term supply of direct metal, as well as an agreement to furnish molds to the Cambria Steel Co., Johnstown, Pa., the Pennsylvania Steel Co. and the Maryland Steel Co., Sparrows Point, Md., for a corresponding period.

Improve Lebanon Plant

It is probable that the Pennsylvania Steel Co. will make rather extensive improvements at its Lebanon blast furnace plant, which consists of two 300-ton furnaces, to meet the necessary requirements to furnish metal to the foundry interest. Under normal conditions the proposed ingot mold plant will require about 7,000 tons of Bessemer pig iron a month. Trade journal quotations will be used in arriving at the monthly settlement of metal prices.

The Valley Mold & Iron Co., which now operates an extensive plant at Sharpsville, plans to erect a modern ingot mold plant at Lebanon, work on which it is expected will begin within a short time.

Officials of the Pennsylvania Steel Co. and the Valley Mold & Iron Co. are co-operating to perfect details of the operating arrangements. Plans for the plant are practically completed. William H. Donnor is president of the Cambria Steel Co. and chairman of the board of directors of the Pennsylvania Steel Co. and the Maryland Steel Co., all of which, as previously mentioned, will receive their supply of molds from the new plant. George H. Boyd is president and Floyd K. Smith vice president, of the Valley Mold & Iron Co.

Car Buying

Shows Some Improvement — More Inquiries Pending

Chicago, July 21.—Somewhat better conditions are evident in the car market and a number of inquiries are out. The Union Pacific and Southern Pacific are asking for about 4,000 steel underframe cars each, the Chicago Great Western about 500, and the Wabash Railroad has not yet closed for the 1,500 cars it has been seeking for some time. The New York Central has awarded 2,500 of its inquiry, divided equally between the Ralston Steel Car Co. and the Haskell & Barker Car Co.

The Illinois Central has closed for about 7,500 tons of shapes and plates to be made into steel underframes in its own shops. These were awarded a Pittsburgh independent mill.

Cleveland Railway Co. Orders

Cleveland, July 21.—The Lackawanna Steel Co. has taken an order for 500 tons of rails from the Cleveland Railway Co. The Kuhlman Car Co. has placed an order for the steel for 200 new street cars, about 500 tons. It is understood the steel will be rolled by an independent mill.

Recent Rail Orders Help

Pittsburgh, July 21.—Heavy buying of standard steel rails a few weeks ago is helping mill operations in this territory. Mill managers report that no orders of importance have been taken this week. The light rail market has reflected some irregularity. Demand for spikes and other track fastenings is unchanged.

Order From the Southern.

Birmingham, July 20.—The Tennessee Coal, Iron & Railroad Co. has received an order from the Southern Railway for 10,000 tons of rails. The Southern was in the market for 37,000 tons, and it is believed by some local rail men that the remaining 27,000 may be given to the Tennessee company in the course of the next few weeks.

CAR AND LOCOMOTIVE ORDERS

New York Central railroad has ordered 2,400 gondolas additional for the Toledo & Ohio central railroad, of which 1,400 will be built by the Ralston Steel Car Co. and 1,000 by the Haskell & Barker Car Co. The same system still is figuring on 1,500 box cars.

Chicago & Midland Valley railroad has placed 250 box cars with the Haskell & Barker Car Co.

Southern Pacific railroad has ordered 20 mikado and 10 switching locomotives from the Lima Locomotive Corporation.

Bangor & Aroostook railroad has ordered five superheater consolidation freight locomotives from the American Locomotive Co.

Valuable Ore Chart

A chart showing annual shipments from each mine on the Marquette, Menominee, Gogebic, Mesabi, Vermillion, Cuyuna, Baraboo and Mayville ranges has just been published by THE IRON TRADE REVIEW. The chart is 26 x 31 inches and is similar to those issued annually from 1890 to 1911.

Yearly shipments are shown from each mine from 1894 to 1913 inclusive, making the chart more complete and valuable than any published previously. In addition, the complete tonnage shipped by each mine in the years prior to 1894 is shown, and a grand total is given which is the exact tonnage shipped by each mine in the Lake Superior district since its opening.

This chart is furnished for 50 cents a copy, but can be secured together with a volume of "The 1913 Lake Superior Iron Ore Annual", cloth bound, for $1, and leather bound for $2. This book gives detailed figures to Jan. 1, 1913. Together with the ore chart, it furnishes a complete record of all mining activities to date. In addition to mine shipments, the book includes mining costs, complete range shipments, lower lake receipts, average analyses and other information of value to all associated with the iron mining industry.

Copies of the chart, either by itself or in conjunction with "The 1913 Lake Superior Iron Ore Annual", can be secured by addressing THE IRON TRADE REVIEW, Cleveland.

Start By-Product Plant

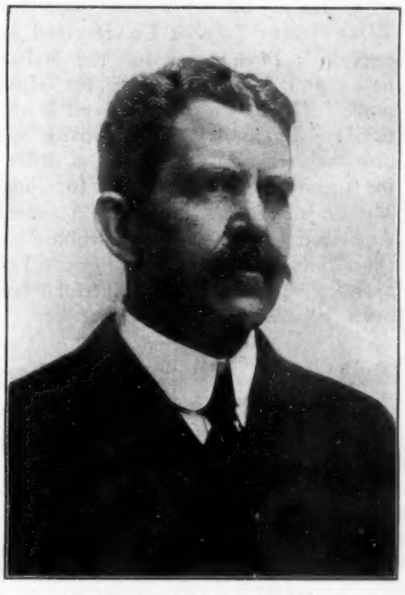
The new Koppers by-product coke plant of the Maryland Steel Co., at Sparrows Point, Md., has been completed and about one-half the capacity has been put into service. The total plant consists of 126 ovens. The new ovens supplant a former by-product plant at this works. The steel works, blooming and rail mills, which have been idle for several weeks, resumed operations last week. Two of the blast furnaces have been operating steadily.

Obituaries

J. Weidman Murray, aged 60 years, for many years connected with the iron and steel trade at Pittsburgh, died July 16 at his home in that city. He was representative of the Allis-Chalmers Mfg. Co., Milwaukee, at the time of his demise. Mr. Murray was born at Lebanon, Pa., and went to Pittsburgh in 1876 to become associated with the old Keystone Bridge Works. Subsequently he became identified with the Weimer Machine Works, Lebanon, and later moved to Birmingham, Ala., to become mechanical engineer for the Tennessee Coal, Iron & Railroad Co. Mr. Murray returned to Pittsburgh 19 years ago to become manager for the E. P. Allis Co., and continued in the capacity of Pittsburgh representative upon consolidation of the Allis-Chalmers Co. He was a member of a number of social, fraternal and technical societies, including various Masonic orders, the Duquesne club, the American Iron and Steel Institute, the American Society of Mechanical Engineers, and the Engineers' Society of Western Pennsylvania.

Louis Theodore Nolker, president of the Commercial Electric Supply Co., died at his home, Lindell boulevard and Taylor avenue, St. Louis, Friday, following an illness of one year. He was 37 years old and a bachelor.

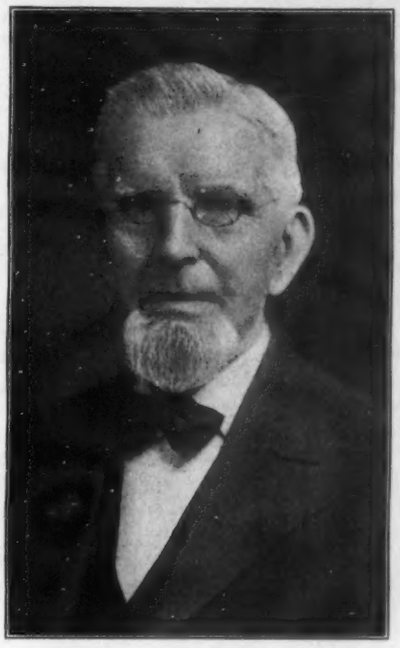
Arthur J. Judge Sr., of St. Louis, died suddenly in Kansas City, Mo.,



J. WEIDMAN MURRAY

Friday, July 16, aged 79. He was born in Kingston, Jamaica, and went to St. Louis in 1857 and founded the McMurry & Judge Architectural Iron Co. He superintended the building of the Grand avenue viaduct and many large buildings in St. Louis. Later he became superintendent of public buildings with offices in Kansas City.

Joseph Soisson, veteran fire brick manufacturer, and well known in the iron and steel trade, died last week



JOSEPH SOISSON

at Connellsville, Pa., where he had lived for 65 years. He was 85 years old. Mr. Soisson was president of the Soisson Fire Brick Co., Connellsville and Bollivar, Pa., and was actively interested in three banking institutions in that part of the state. Several years ago he and his wife celebrated their fiftieth wedding anniversary. He is survived by his widow, six sons and three daughters.

Charles E. Dix, one of the assistants to the purchasing agent of the Pennsylvania railroad at Philadelphia, died recently. He gave much of his attention to machinery requirements and was well known in the eastern iron and steel trade.

William Bleeker Potter, mining engineer and metallurgist, founder and manager of the St. Louis Sampling & Testing Co., died at his home, 4021 Washington boulevard, St. Louis, last Tuesday, aged 68 years, death being due indirectly to an ulcer of the stomach. He was son of the late Bishop Henry Carman Potter, of New York, was born at Schenectady, N. Y., and received an A. B. degree from Columbia University in 1866, A. M. in 1869 and E. M. from the Columbia School of Mines in 1869. He was assistant in geology at Columbia from 1869 to 1871, assisted in the geological survey of Ohio, and was a member of the board of the Missouri geological survey from 1889 to 1893. He was at one time president of the American Institute of Mining Engineers, and in 1904 received an honorary degree of Sc. B. from Columbia.

Alexander Watson Cadman, aged 67, head of the A. W. Cadman Mfg. Co., Pittsburgh, and one of the oldest manufacturers of brass in that city, died July 19 at his home in Edgwood, a suburb of Pittsburgh. Mr. Cadman was born in Allegheny, where he was educated in the public schools. He succeeded his father in business.

Thomas B. Lappan, 51 years old, died July 15, at his home in Pittsburgh, where he was born. He was the son of James Lappan, founder of the James Lappan Mfg. Co. and was president of that company at the time of his death. Mr. Lappan was educated in the Pittsburgh public schools and was graduated from Holy Ghost College, now Duquesne University. Upon completion of his education, he entered his father's foundry, working up through the ranks to the presidency of the company. Three sons and two sisters survive.

May End Receivership.—The Barney & Smith Car Co., Dayton, O., according to late reports, will end its receivership shortly. At a directors' meeting a few days ago, plans were laid providing for a debenture bond not to exceed $2,000,000. Stockholders are given the privilege of subscribing to these bonds in pro-

THOMAS B. LAPPAN

portion to the shares of stock they hold. General Manager Stevens states that enough orders are now on file to keep the plant running several months. A stockholders' meeting will be held soon.

Ryerson

Enters the St. Louis Field—Takes Over W. G. Hagar Iron Co.

Joseph T. Ryerson & Son, who have long been prominent in the iron, steel and machinery business in the Chicago district, have taken an important step in the establishment of warehouses in St. Louis for immediate service in their lines to customers in the territory tributary to that city. The firm is entering the field with the taking over of the plant, merchandise, equipment and good will of the W. G. Hagar Iron Co., and will immediately supplement this plant with complete modern warehouses and equipment for the handling and cutting of shapes, plates, reinforcing bars and similar heavy material.

Ready to Make Forgings

The new plant of the Thurlow Steel & Forging Co., at Chester, Pa., has commenced operating. It is equipped for the manufacture of steel forgings weighing from 1 to 10,000 pounds, the equipment including steam hammers and a 1,000-ton forging press for extra heavy work. The company also operates a large heat-treating plant and a machine shop, which afford facilities for turning out rough or finished, treated or untreated forgings of all kinds. The plant is especially equipped to handle nickel steel, nickel chrome steel, vanadium steel and other alloy steel forgings. The company is under the management of John I. Rogers and Daniel C. Eagan. The Thurlow Steel & Forging Co. is closely associated with the steel foundry operated at Crum Lynne, Pa., by the Eagan-Rogers Steel & Iron Co.

Will Erect a Large Plant

The Aluminum Co. of America has just commenced work in its main offices at Pittsburgh on the plans for a new plant which is to be erected at Edgewater, N. J., which is directly across the Hudson river from New York City. The plant is to cost about $2,000,000 and the work of erection is to be commenced early in fall. It will be the largest of its kind in the world and is expected to employ between 2,000 and 3,000 workmen. It will be used for the manufacture of all kinds of aluminum cooking utensils and other aluminum ware. A large part of its output will be sold in the eastern market, which up to the present has been supplied largely by European manufacturers. A good deal of the output also will be exported, and for this purpose the company will build private docks. The site to be occupied by the plant has just been purchased by the company at a price said to have been $400,000. It lies along what is known as the River road, Edgewater, and includes a proposed thoroughfare which was to be known as Vreeland avenue. The Aluminum company will ask permission of the authorities at Edgewater to vacate this thoroughfare and it is expected permission will be granted.

Steel Makers

Interested in Work of Branch Offices of Commerce Bureau

Washington, July 21.—According to a statement issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce, increasing interest is being displayed among business concerns in the work of the bureau and its four branch offices in operation in New York, Chicago, New Orleans and San Francisco. Results, it is contended, show that the branch offices will be of even greater benefit to American manufacturers than was at first anticipated.

Many who heretofore have made no effort to engage in the export trade now appear anxious to do so, the statement says, and the lists maintained at the various branch offices of the business houses which are to receive the information distributed are being augmented daily. It was said at the bureau that included in the lists kept at the branch offices are the names of many steel makers.

Starting Big Ore Dock

Preliminary contracts are being let by the Lehigh Valley railroad for the construction at Constable Hook, N. J., in New York harbor, of a large iron ore dock to accommodate shipments of foreign ore, announcement of the general plans for which was made some weeks ago. One of the principal uses to which the new dock will be put and for which it will be designed largely, will be the handling of the incoming ore from the mines of the Bethlehem Steel Co., near Cruz Grande, Chile, which in quantity are to come in eventually through the Panama canal. The dock also will serve importations of ores from other countries consigned to eastern blast furnaces. When it is in operation, considerable of the foreign ore now being received at Philadelphia undoubtedly will be diverted through the port of New York. The new pier will be 1,150 feet long and will have a basin 200 feet wide. It will be fitted with unloading and other equipment capable of handling about 1,000 tons of ore an hour.

Announce Program

For Meeting of Lake Superior Mining Institute

The Lake Superior Mining Institute, as noted previously, will assemble at Ishpeming, Mich., Aug. 31, in annual meeting, with the closing session to be held in Detroit. As arranged by Secretary A. J. Yungbluth, the itinerary is as follows:

Monday, Aug. 31.—At Ishpeming. First-aid exhibition by teams of miners from the various ranges; automobile tour of the mines, followed in the evening by a business session.

Tuesday, Sept. 1.—Leave at 4 a. m. via Duluth, South Shore & Atlantic railroad for St. Ignace. Leave Straits of Mackinac 10:45 a. m. via Detroit & Cleveland Navigation Co.'s steamer City of Detroit II for Detroit. Business sessions afternoon and evening.

Wednesday, Sept. 2.—Arrive Detroit 9 a. m. Day to be spent in visiting various industrial plants.

Thursday, Sept. 3.—Visit at Detroit to continue until 5:30 p. m., when steamer will depart for St. Ignace.

Friday, Sept. 4.—Arrive St. Ignace 3:30 p. m. Party then to proceed to the mining regions and disperse.

Turbines for Export

The Terry Steam Turbine Co., Hartford, Conn., is starting work on an order for 24 steam turbines, received from N. Odero & Co., Sestria, Ponente, Italy. About a year ago the Terry Steam Turbine Co. received an order for 19 turbines for the Italian navy, and later an order for eight more. The order just received is the third of its kind. The company has also received a large number of orders for turbines to be exported to Cuba, Mexico and South America. A recent American order is for 20 turbines for the Philadelphia Electric Co. The capacity of the plant at Hartford has been increased about 25 per cent.

Building Concentrating Plant

A modern concentrating mill is being erected at Mineville, N. Y., by Witherbee, Sherman & Co., Inc., iron ore operators in the Port Henry district, to replace the Nos. 1 and 2 mills recently destroyed by fire. The new mill will follow the latest ideas in design and equipment and will have a capacity practically equal to the two former mills. It will be of concrete and steel construction, whereas the former mills were of the wooden type. The location of the new mill will be upon the site of the former No. 1 concentrator.

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

W. S. Pilling, of Pilling & Crane, Philadelphia, is taking a motor trip through New England.

A. C. Daft, 445 Oliver building, Pittsburgh, dealer in ferro alloys and pig iron, is enjoying a vacation in the east.

Charles A. Morse, of the Simplex Wire & Cable Co., will be chosen director of the Federal Reserve Bank, Boston.

L. Quesada, a prominent iron broker of Havana, Cuba, was in Birmingham, Ala., the past week on a business and social trip.

A. H. Jarriki, president of the Jarriki Mfg. Co., Erie, Pa., is sojourning in Europe and expects to remain there for some time.

T. I. Crane, of Pilling & Crane, Philadelphia, will sail July 18 for an extended tour of Europe. He expects to return in September.

Hugh R. Hyndman, connected with the Pittsburgh office of the Washington Coal & Coke Co., Dawson, Pa., is enjoying a vacation in Canada.

John R. McGinley, Pittsburgh, chairman of the board of directors of the Chicago Pneumatic Tool Co., Chicago, has gone to Europe, where he will remain until Sept. 1, on a business trip.

Rudolf Kauert, of Kauert & Doehler, large dealers in machine tools and supplies, with offices at Montreal and Toronto, returned from Europe on July 15, after a six weeks' trip in England and on the Continent.

E. L. Leeds, manager of the railroad department of the Niles-Bement-Pond Co., New York City, has started out on a two-months' trip on which he will investigate business conditions in all parts of the country.

F. C. Kent, formerly general superintendent of the Pierce-Arrow Motor Car Co., has severed his connection with that company to become works manager of the Lodge & Shipley Machine Tool Co., of Cincinnati.

Clarence Hayward, who is connected with the Domhoff & Joyce Co., Cincinnati, is spending his vacation by an extended trip through the mountains of Kentucky. Mr. Hayward will return to Cincinnati about Aug. 1.

Walter J. Bothwell, formerly assistant general manager of sales of the Union Drawn Steel Co., Beaver Falls, Pa., has been appointed district sales manager of a new office recently opened by that company in the Dime Bank Building, Detroit.

J. F. Haig, purchasing agent of the Pennsylvania Steel Co., has resigned and has taken a position in the purchasing department of the Pennsylvania railroad where he formerly was employed. He has been succeeded by W. B. Enck, formerly assistant to the purchasing agent of the Cambria Steel Co.

R. W. Clark, recently elected a member of the American Iron and Steel Institute, is head salesman for the New York office of Rogers,

R. W. CLARK
New Member American Iron and Steel Institute

Brown & Co. Mr. Clark has been connected with this firm for 14 years, having started as an office boy with their Chicago office in February, 1900. In June, 1905, he was transferred to their Buffalo office in the capacity of junior salesman. He remained there for about two months, when he was transferred to fill the position of first salesman at their Boston office. This position was held until February, 1907, when he was transferred to their New York office as second salesman, from which he was advanced to his present position in January, 1909.

Daniel Lewis, who for many years has been connected with the Eastern Bolt & Nut Co., Providence, R. I., has accepted the position of factory manager for the Wm. H. Haskell Mfg. Co., Pawtucket, R. I., manufacturer of bolts and nuts. Mr. Lewis assumed the duties of his new position July 20.

Paul Ryan, sales promotion and advertising manager of the National-Acme Mfg. Co., Cleveland, has resigned to accept the position of general manager of sales of the Osborn Mfg. Co., of the same city. The Osborn company manufactures a complete line of molding machines as well as brushes and brooms for all industrial purposes.

Samuel S. Webber, Trenton, N. J., has resigned his position as chief engineer of the Trenton plant of the American Steel & Wire Co., and has gone to Charlestown, N. H., to spend the summer. For a quarter of a century Mr. Webber was connected with the Trenton Iron Co. before it became a part of the American Steel & Wire Co.

Frank N. Eaton, who recently retired as resident partner of Hickman, Williams & Co., with offices in Cincinnati, has gone to Troutville, Col., where he will spend several months. Mr. Eaton remains on the board of directors of Hickman, Williams & Co., but has resigned temporarily from active work in order to go west to regain his health.

John V. Rice Jr., inventor of the Rice double-acting gasoline engine, the Rice gasoline rock drill and numerous mechanical devices, has been appointed chief of the engineering staff of the Elizabeth Ship Building Co., Elizabeth, N. J. The Elizabeth plant is one of the largest marine engineering establishments in the east. The Rice marine motor is now being manufactured there and the rock drill, lately perfected, is soon to be turned out in a large shop now in course of construction.

Albert Pott, sales manager of the Baird Machine Co., Bridgeport, Conn., sailed July 15 for a two-months' trip through the British Islands and France. He will visit foreign representatives of his company and get in touch with foreign trade in general. The Baird Machine Co. recently has noticed improvement in demand from abroad. Mr. Pott makes his trip at this time in order to become thoroughly acquainted with all new phases of foreign trade, as well as to take care of the increasing export business of the company.

Depression

Reflected in Foreign Commerce—Exports Largely Reduced

The world-wide depression in the iron and steel business is reflected in the imports and exports of iron and steel products for May and for the 11 months ending with May, as reported by the bureau of foreign and domestic commerce of the department of commerce. The imports for May, 1914, were 28,169 tons, compared with 28,726 tons in May, 1913. The tonnage would doubtless have been considerably smaller if the tariff had remained as it was a year ago. The principal increase was in pig iron, of which the imports of last May were 17,182 under free trade, as compared with 13,795 in May, 1913.

IRON AND STEEL IMPORTS, GROSS TONS

	May,		Eleven Months end. May,	
	1914.	1913.	1914.	1913.
Scrap	997	2,198	29,656	35,494
Pig iron	17,182	13,795	126,804	141,663
Blooms, billets, steel, n. e. s.	2,584	2,292	33,999	18,750
Wire rods	658	1,961	10,860	14,907
Rails	2,189	781	14,709	4,427
Bar iron	854	2,939	20,200	27,328
Structural	573	1,398	9,924	6,260
Sheets and plates	464	500	2,855	3,557
Tin plates	2,668	2,862	21,631	4,927
Total	28,169	28,726	270,638	257,313

Exports show a decrease, the total for May, 1914, being 139,104 tons, compared with 242,351 tons in May, 1913. For the 11 months, the decrease is more impressive, it being 633,181 tons.

The imports of iron ore for May, 1914, were 125,659 tons, compared with 191,860 tons in May, 1913.

IRON AND STEEL EXPORTS, GROSS TONS

	May,		Eleven Months ending May,	
	1914.	1913.	1914.	1913.
Scrap	3,411	7,235	66,684	97,206
Pig iron	11,726	19,527	189,101	264,238
Billets, sheet bars, etc.	6,872	9,361	41,800	223,406
Wire rods	6,767	8,906	44,117	69,530
Rails	15,659	32,097	325,452	407,971
Steel bars	10,150	18,240	137,971	214,878
Iron bars	359	1,126	9,966	22,145
Structural	14,772	37,382	280,449	328,901
Hoop, band and scroll	968	1,120	10,762	17,146
Sheets and plates	28,678	42,318	301,696	501,308
Tin plates	4,695	5,764	40,093	67,796
Barbed wire	5,336	7,487	73,042	81,412
All other wire	7,062	10,809	77,417	125,920
Cut nails	661	148	4,175	4,630
Wire nails	2,366	3,734	33,555	50,703
All other, including tacks	311	376	2,958	3,980
Pipes and fittings	16,355	32,498	222,761	254,036
Railroad spikes	1,075	1,112	7,872	11,737
Bolts, nuts, rivets, washers	1,401	2,381	18,491	19,456
Horse shoes	122	131	1,177	1,070
Cast radiators	358	599	5,134	7,835
Total	139,104	242,351	2,142,123	2,775,304

Will Follow Suit Soon

Pittsburgh, July 22. (By wire.)—Although practically all makers of plates, shapes and bars in this district have advanced prices to the basis of 1.15c, the 1.10c figure has not been withdrawn in all instances. Manufacturers who have not withdrawn quotations below 1.15c strongly intimate that they expect to do so today or tomorrow at the latest. The Carnegie Steel Co. was the first to withdraw prices below 1.15c, having sent out notices to that effect last Monday. Mill managers say business this month, both in specifications and new tonnage, just about keeps pace with that of June.

Bridge Work

Taken by the American Bridge Co.—Other New Contracts

New York, July 22. (By wire.)—The American Bridge Co. has taken 1,500 tons for an Erie railroad bridge over the Susquehanna and 1,200 for a bridge for the Oregon Short Line.

The Riter-Conley Mfg. Co. has 1,200 tons for tank works for the Calumet & Hecla Mining Co., and the McClintic-Marshall Co. 1,000 tons for the Sea Beach elevated line of the New York Municipal Railways in Brooklyn. Inquiries include 1,000 tons for additions to the Newport Rolling Mills and 1,200 for bridge work on the San Diego & Arizona.

Steel Barges

Will Require About 15,000 Tons of Plates

New York, July 22. (By wire.)—The Newark & Buffalo Steamship Co. has placed contracts with Hamilton & Chambers, this city, for the construction of 30 steel power barges for the new Hudson River line. About 15,000 tons of plates will be required. The barges are to be built at the yard in Albany.

Rail Order

Not Awarded Canadian Mill But Goes to Carnegie Steel Co.

New York, July 22. (By wire.)—The recent report which caused some stir in rail circles that the Toledo, St. Louis & Western had placed an order with the Algoma Steel Co. mill proves to be unfounded. This road has bought no rails in Canada and is closing for 1,000 tons with the Carnegie Steel Co., leaving the remainder of its recent inquiry for 3,000 tons unacted upon.

A western road is about to place 12,000 tons. The Denver & Rio Grande has placed some tonnage with the Colorado Fuel & Iron Co.

Rail makers are now receiving specifications from the Pennsylvania on its recent rail contract.

Date Changed

For Putting New Southern Pig Iron Rates Into Effect

Washington, July 21.—A modifying order has been entered by the Interstate Commerce Commission changing the effective date of the new rates on pig iron ordered in the Sloss-Sheffield decision from Aug. 15 to Oct. 1. The change was made at the request of the railroads on the ground that the former date did not give sufficient time in which to prepare and file the new tariffs.

METAL MARKETS

Chicago

Chicago, July 21.—Business in new metals is not resuming its normal swing, but prices have remained stationary the past week and signs of an improvement in some quarters have appeared. Not much material is moving and prices are dependent on quotations in other centers.

We quote dealers' selling prices f. o. b., Chicago, as follows:

Lake copper, carload lots, 13.35c; casting, 13.75c; smaller lots ¼c to ¾c higher. Spelter, car lots, 4.90c; lead, desilverized, 3.80c; sheet zinc, $7.00, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 33.00c; Cookson's antimony, 7.12½c; other grades, 5.65c.

Old metals remain nominal and comparatively little business is being done. Consumers are not interested and dealers have large stocks on hand which they are unable to move except an occasion sale.

We quote dealers' selling prices, f. o. b., Chicago, as follows:

Copper wire, crucible shapes, 12.50c; copper bottoms, 11.00c; heavy red brass, 11.00c; heavy yellow brass, 8.75c; No. 1 red brass borings, 10.00c; No. 1 yellow brass borings, 7.50c; brass clippings, 8.50c; lead pipe, 3.60c; zinc scrap, 3.90c; tea lead, 3.30c; No. 1 aluminum, 11.50c; No. 1 pewter, 19.00c; block tin pipe, 28.00c; tin foil, 23.00c; linotype dross, 2.75c; electrotype dross, 2.75c; stereotype plates, 4.00c; stereotype dross, 2.75c.

Testing Drills, Taps and Dies

Description of a Machine for Testing Rotating Cutting Tools With Graphic Recording Mechanism

BY T Y OLSEN

EFFICIENCY in production is the keynote in all well-managed manufacturing establishments and it is in no small measure the result of, and regulated by, tests of some description. It is controlled not only by methods of operation and design of special machinery, but also very largely by the kind and quality of the cutting tools to be used in a given operation.

The testing of materials has been developed mainly with the view of saving life or preventing injury, and at the same time of decreasing the quantity of material used to a minimum by raising its quality to a maximum. Testing has now broadened, however, and is being pushed into every phase of construction and manufacture.

In any manufacturing plant where metal is machined, there are two classes of tools used. One class comprises the fixed machines, whose quality, adaptability and use may be determined from inspection of design and construction. These tools are of a high first cost and are considered a part of the plant proper. The second class consists of cutting tools, and is small and insignificant when each tool is considered by itself. Such tools, however, are the real expense in operation, as the efficiency and output of any machine tool, no matter how well designed, is a function of the quality and form of the cutting tool. Such tools are quickly used up and must often be renewed. Their cost is large in the long run, but comparatively small when we consider what may be gained in production by the use of a high-speed cutting tool over the ordinary cutting tool of today.

This second class of tools comprises the following: (1) Tool steel, as used in lathes, shapers, planers, boring mills, etc.; (2) files of all descriptions; (3) hack-saw blades; (4) drills, taps, dies and reamers, and (5) milling cutters. Also under the list of tools of this description are included grinding wheels.

All of the tools mentioned above are purchased today largely through the efforts of salesmen, and as each salesman claims to have the very best, it is difficult to decide what to purchase. Usually, the sale goes either to the best salesman or to the lowest bidder. Also, purchasing agents in their efforts to serve well often buy only at the lowest price irrespective of quality. It should therefore be the object of any engineering department to specify such tests of material to be purchased, that the purchasing agent would know how to buy, and be able to obtain at the lowest price material subject to test.

The cutting property and efficiency of tools has been determined in some instances, but only by the very largest users, by means of tests of long duration at great expense. A machine that will give this information accurately and quickly at a minimum expense has been demanded, as it is just as essential for the smaller manufacturer

Paper presented at the annual meeting of the American Society for Testing Materials, Atlantic City, June 30-July 3.

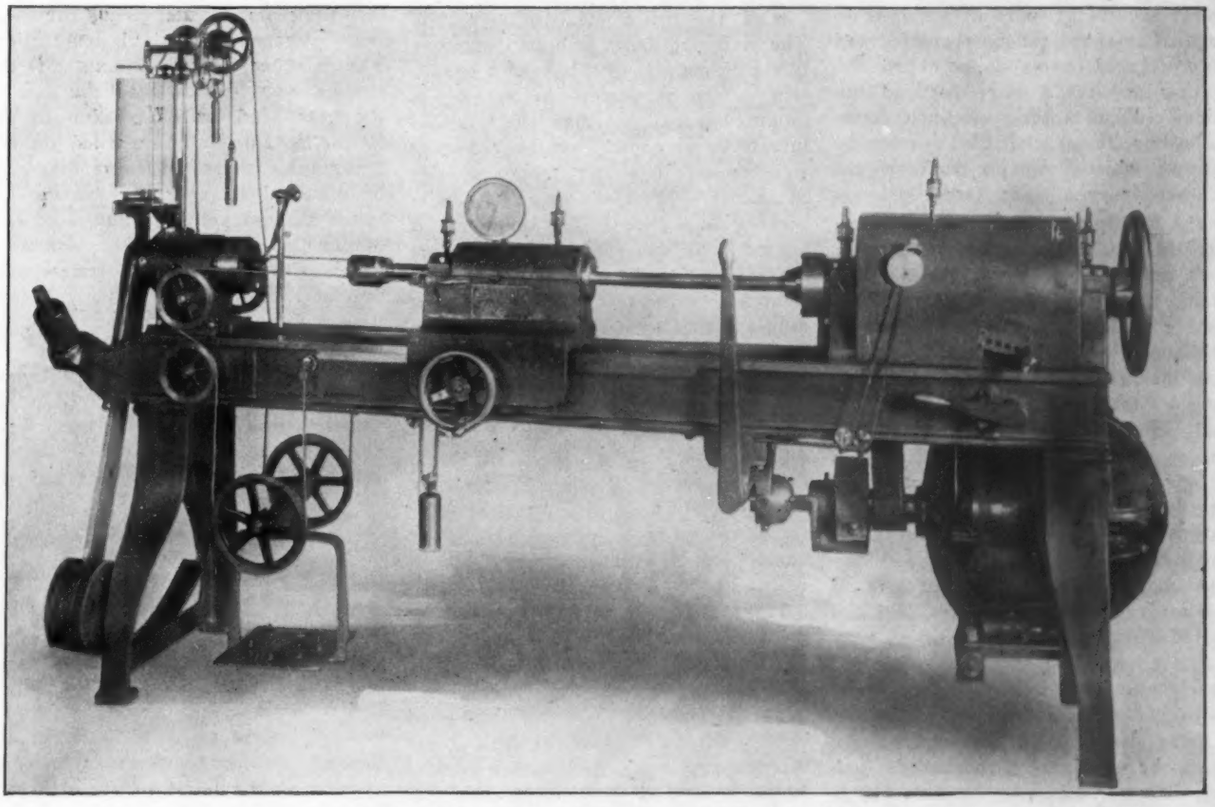


FIG. 1—DRILL, TAP AND DIE TESTING MACHINE

to know the value of his tools and what he is purchasing, as it is for the larger ones.

The first tools of the above-mentioned list to be commercially tested were files, and such tools are today successfully tested by the Herbert file testing and indicating machine. There are now over 100 of these machines in use and they have shown that files may vary greatly in quality. By their use, the proper cut of file for any class of material can also be determined; likewise the cutting property of metals. An attachment can also be obtained for this machine whereby hacksaw blades can be tested to destruction and curves obtained showing their quality.

The cutting property of tool steel has been determined in various ways, but until Messrs. Herbert and Fletcher, of England, devised their machine for testing of tool steel, there were no ready means whereby such quality could be determined, except by actual practice tests, which were tedious and costly. This type of machine is today used by some of the largest tool-steel makers and users in the world, and the results obtained are remarkable, in that they show not only the quality of the tool steel, but also the speeds at which such steel, properly treated, should be run to obtain the highest efficiency. By means of this machine actual cutting conditions are assumed in a manner which produces quick, accurate results at a minimum cost. The speed can be regulated and accurately determined, so that the cutting quality at any speed is obtained. From a series of such determinations the speed curve may be formed, which indicates perfectly the characteristics of the steel.

The testing of these various tools has led to the further desire to test such tools as drills, taps, dies and reamers. A machine for this class of testing presents a far more difficult problem than either of the other machines, since in this case it is necessary to test finished tools under actual working conditions. The machine must cover all conditions as to speeds and feeds, and must measure four variables, namely, pressure, torque, penetration and number of revolutions.

A machine to cover this class of testing is known as the Olsen drill, tap and die testing machine, and as here described was designed to meet the specifications of the Philadelphia navy yard. This machine, illustrated in Fig. 1, was designed to test drills, etc., from the smallest up to those 1 inch in diameter. To cover this large range of drills it was necessary to provide spindle speeds of from 50 to 1,000 revolutions per minute, as well as a hand attachment for use in testing taps, dies, reamers, etc.

The feed problem resolved itself into two types; that of gravity or dead weight, and a positive feed. The pressure measured is that which is exerted by the point of the drill on the material. It should be accurately obtained and in such a manner that it may be read off from an automatically recording dial at any time during the test.

The torque, which is the measure of the resistance to cutting, should, for accuracy, be measured by dead weight. This measurement must also be arranged so it will distinguish with equal degrees of sensitiveness the variations in small as well as large drills. The penetration is the measure of the depth of bore, taken directly from the motion of the cutting tool into the test material. The number of revolutions required to give a certain penetration is also determined.

How the Machine is Constructed

The machine consists of a bed on which a weighing head is mounted, at one end, which holds the material to be cut. At the other end is mounted a driving head with an arrangement for changing speeds and positive feeds, etc. Between these two heads is a carriage mounted on ball-bearing rollers, supporting the spindle which carries the drills, etc., to be tested. The weighing head is bolted securely to the frame and in this head a pendulum, which measures the torque, is mounted in ball bearings. The pendulum is so arranged that by changing weights on it a maximum capacity of either 100, 1,000 or 2,000 inch-pounds is secured. The moment or torque may be read from a direct reading, uniformly marked scale at any time during the test. Above the pendulum is mounted a large drum which by its rotation accurately records the torque on equally spaced cross-section paper and to a largely magnified scale. To dampen the action of the pendulum an air piston is provided, which can be adjusted to suit requirements. Also, in cases where the drill may run temporarily above capacity or for some reason becomes stuck for an instant, the excess torque to an amount of 3,000 inch-pounds can be measured on an additional scale.

The operating head rotates the spindle and is fitted with a changeable gear mechanism, and variable-speed motor drive, so that by one lever change any speed and motor control between 50 and 1,000 revolutions per minute can be obtained. In this head is located the positive feed mechanism, which can be thrown in or out of operation by a small lever, controlling a split taper nut on the spindle. This nut is given a rotation a fraction slower than the spindle speed, causing it to advance in proportion to the retarding of the nut. If both were to run at the same speed there would be no feed. The changes of feed are thus quickly made by shifting a sliding gear as indicated in the gear head, and a feed of either 0.01, 0.02, 0.03, 0.04 or 0.05 inch per revolution can be obtained.

The spindle is of vanadium steel and operates through a carriage as shown, which is free to move on the bed. In this carriage is mounted the dial indicator, which measures through the action of a hydraulic diaphragm the pressure on the point of the drill. The pressure is measured directly and automatically up to 5,000 pounds. In a more recently built machine of this type the pressure indicator has been mounted on the weighing head, where it is more directly under the eye of the operator, while testing.

The carriage is also mounted as noted above on ball-bearing rollers and through it the gravity feed may be applied by adding standard weights to the scale pan as shown. A scale attached to the carriage indicates the actual penetration of the drill. The penetration may also be noted by the motion of a pencil on the rotating recording drum, thus giving the relation between torque and penetration. The number of revolutions of the spindle may be noted on the dial in the gear head, or its relation to the torque automatically recorded on the autographic chart. A curve may also be obtained showing the relation between penetration and number of revolutions, so that the machine will show graphically the relation between any two of the variables, torque, penetration and number of revolutions.

Both the weighing head and power head are arranged so that standard chucks can be used. The drills are usually placed in the power head and the material to be bored in the weighing head. In the case of die testing, however, the die is placed in the weighing head and the bar to be threaded in the power head and thus the bar, which may be of considerable length, can pass through the hollow spindle of the weighing head.

Ball bearings, both thrust and radial, are used throughout the machine. The bed is fitted with a trough and pump, and piping is provided so that any desired cutting compounds can be applied at the point of the drill and

(*Continued on page* 182b.)

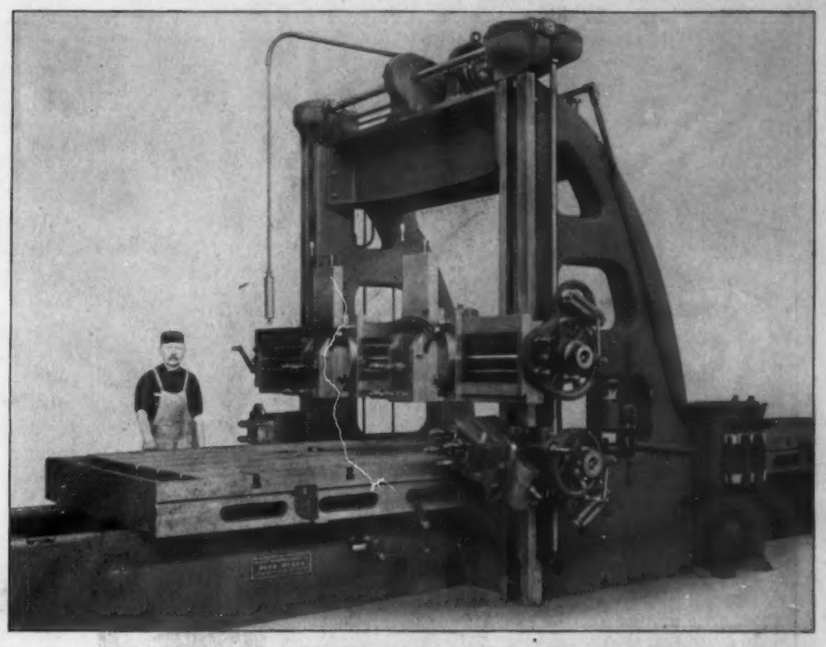
New Pond Planer

The accompanying illustration shows a 72-inch Pond reversing motor planer equipped with electric feed and power traverse for all heads. Reversing motor drive has eliminated all belts, pulleys, clutches, etc., and electric feed dispenses with the feed box. The motor is directly connected to the first driving gear shaft on the back side of the planer, giving the operator free access to the entire control at the front of the machine.

A wide range of cutting and return speeds is provided. They may be varied independently of each other, while the machine is running, by means of the two handwheels on the front of the controller case. The handwheels are equipped with dials graduated for the various speeds.

A shaft runs through the bed with levers on either side for hand control of the table. These levers are the same as on a belt-driven planer; hence the operator has no new movements or operations to learn. A patented pendant switch, carried by a swiveling bracket mounted on the arch, may be moved to any convenient position. By means of this switch the operator can start, stop or reverse the table if the work requires him to be in such a position that he cannot readily reach either of the levers on the front and back sides of the bed.

At the instant of reversal, the motor through connections in the controller, is disconnected from the line and becomes a powerful dynamic brake, stopping the table at once without drawing any current from the line. To prevent the table from running off the bed and also the breakage of tools or planer, a patented circuit breaker is provided which will stop the motor at once by dynamic breaking.



PLANER WITH ELECTRIC FEED AND POWER TRAVERSE

The newest and most novel feature of this planer is the electric feed and rapid power traverse which is provided for all heads. Both the feed and traverse are operated by a separate motor mounted on the arch. This motor is also used for elevating and lowering the cross-rail. The mechanism for the different operations is interlocked in such a way as to prevent accidental engagement of two functions simultaneously. The amount and direction of the feeds for the cross-rail heads can be changed at each end of the rail. The changes of feed for the side heads are made in a similar manner, the feeds for each head being entirely independent of each other and of the cross-rail heads. The hand adjustment of the side heads is by ratchet crank wrench which is mounted on and moves with the head. All heads have graduated swivels and micrometers on the feed screws.

A Substitute for the Alley

The Phillips Sheet & Tin Plate Co., of Weirton, W. Va., recently completed a playground for the children of its employes. The activities of the children are under the direction of a capable kindergarten teacher. The equipment of the playground is exceptionally complete, including slides, swings, flying rings, merry-go-round, giant stride, see-saw and sand boxes. It is also provided with benches from which the parents or spectators may observe the children at play. The playground appropriation also included an athletic field, provided with a base ball diamond, a quarter mile running track and a grand stand.

PLAYGROUND OF PHILLIPS SHEET & TIN PLATE CO.

A complete treatise on the design, construction and service of the Diesel engine is contained in an unusually handsome book recently issued by the Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, Mo. Chapters are devoted to the history of the Diesel engine and to a discussion of its efficiency and economy, its life, construction and operation. Numerous special installations in all parts of the country are described and illustrated by large, well-made half tones. The book is substantially bound. It will be sent free on application.

Fig. 1—Bungalow for European and American employes

Fig. 2—Pig iron storage yard of the Tata Iron & Steel Co. at Sakchi

Cheap Steel

WITH the tariff wall on iron and steel imports to this country generally lowered and in some cases entirely demolished, the favorable operating costs and export position of certain foreign works are offering at present an interesting source of study and speculation for the American industry, as the possible source of new and formidable competition. India, where it is said on good authority iron and steel products may be manufactured as cheaply, if not cheaper, than any other place in the world, comes strongly to the front in this survey of the foreign field. In no case is there presented a more striking illustration of a combination of cheap labor, raw materials and transportation than in that country, where considerable advance in the building of modern works and in the pursuit of iron and steel manufacturing according to up-to-date methods has

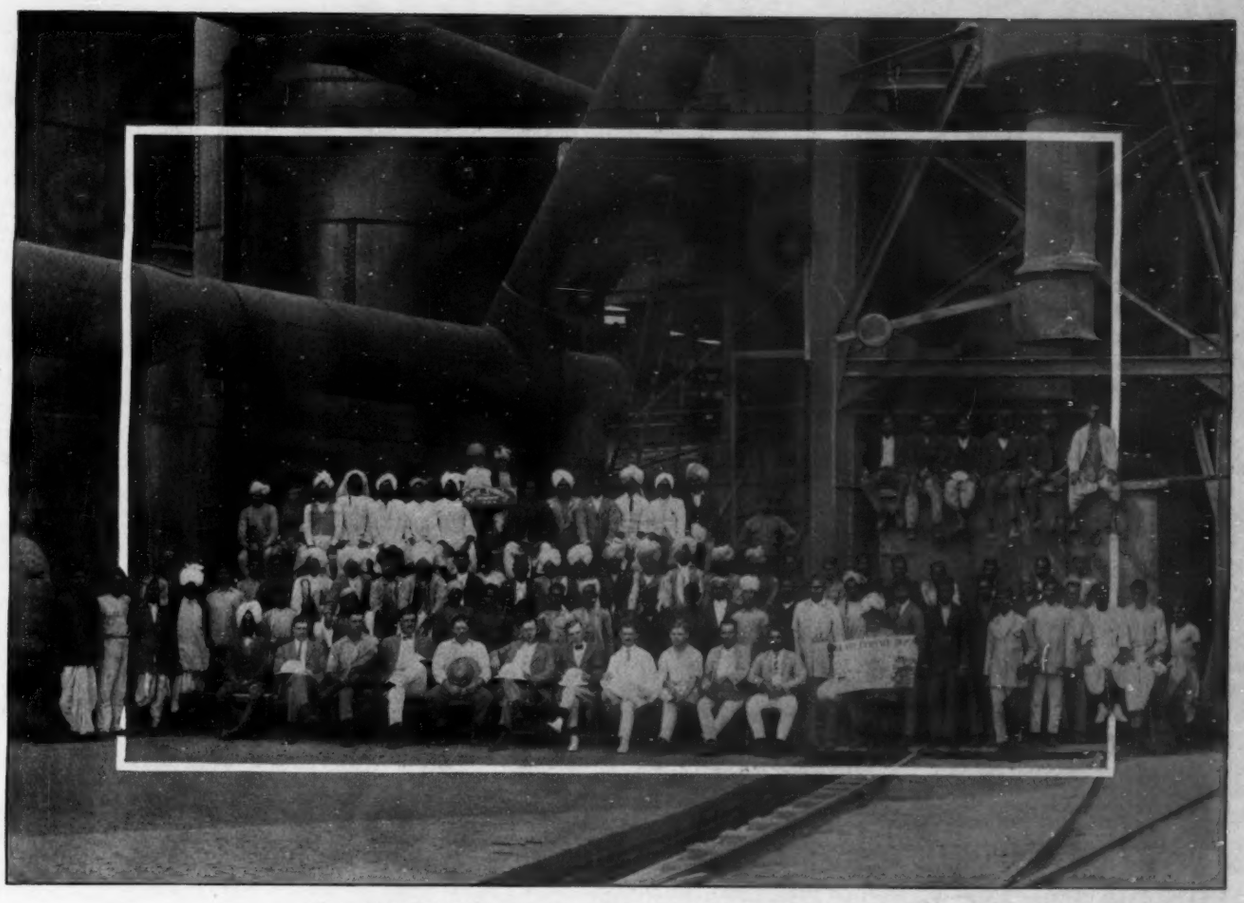


Fig. 3—Blast furnace crew of the Tata Iron & Steel Co. at Sakchi

From India

been made within the past few years. Today pig iron is being made in India at a cost of about $6 a ton and steel ingots at not to exceed $15 a ton, and the latter figure gradually is being reduced as works operations are becoming more efficient. Indian pig iron or finished steel may be laid down on the Pacific coast of North America at a freight rate of $5 to $6 a ton.

In an address delivered before the recent New York meeting of the American Iron and Steel Institute, Charles P. Perin, No. 2 Rector street, New York City, consulting engineer of the Tata Iron & Steel Co., presented some facts and figures regarding the iron and steel industry of India, which made a deep impression upon his audience of domestic iron and steel makers. In that address, Mr. Perin told briefly of the plans of the company to ship standard rails to the Pacific coast of the

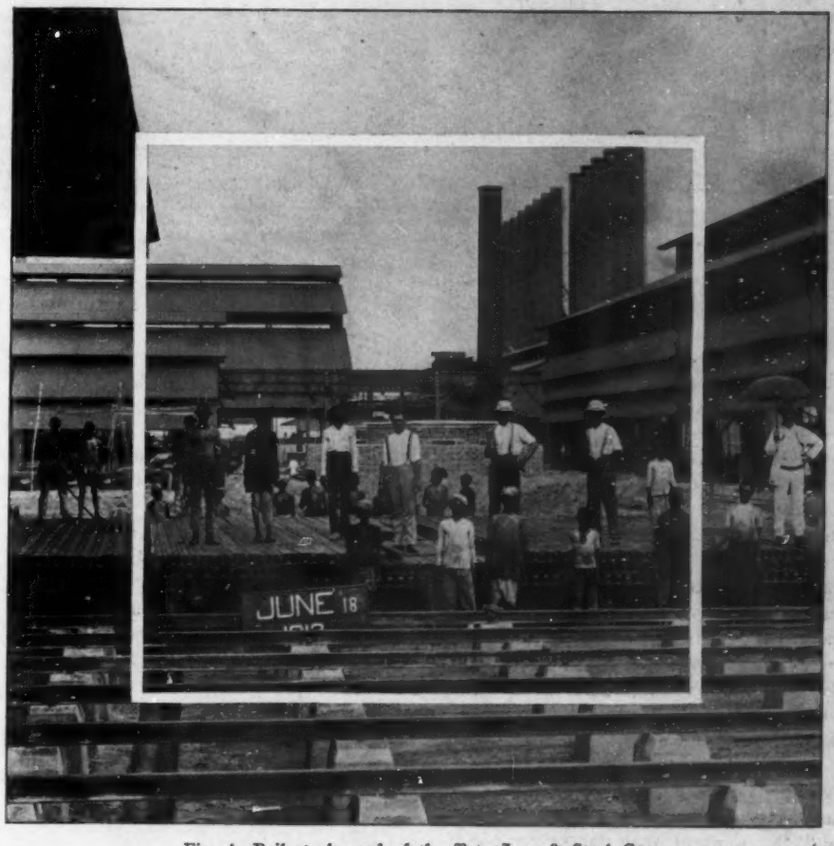


Fig. 4—Rail stock yard of the Tata Iron & Steel Co.

United States, and, in fact, stated that an initial cargo of such material would arrive in the near future. He also referred to the opportunity for the importation of Indian pig iron to both the Atlantic and Pacific coasts. Several months ago, as reported at the time, some negotiations were carried on for the sale of a round block of Indian foundry and off-basic irons along the eastern seaboard, but nothing came of this matter, due to the low domestic market and to the prohibitive freight rates quoted. Recently, this matter has been revived, and efforts now are being made to market 20,000 tons of iron along the Atlantic seaboard. The company already has sold and delivered some trial lots of pig iron upon the Pacific coast of this country. A recent visit to this country of one of the officials of the Tata company was made principally for the purpose of further investigating the possibilities of importing Indian products to this country and Canada. Up to this time, the principal exports of the company have been of pig iron and Japan has afforded it its largest market. Good shipments also are being made to China and Australia. Over 100,000 tons of pig iron have been shipped to Japan since the Tata works were built.

In view of these recent developments, a presentation of some of the intimate details regarding the costs and the general manufacturing conditions of the Tata company, compels interest. The human side of the works, as they are conducted at present, is especially novel and unique when contrasted with American standards.

Pig iron has been made in India for a number of years. Much of this originally came from the native smelters and forges which were of very crude design and operation and the output formed a very insignificant quantity. Some instances of such primitive means of iron making still are to be found in the out-of-way places, although the importation of English and Belgian bars, even to the bazaars of the jungle, has made unfavorable the continuance of such wasteful methods. A view of one of the abandoned native forges is shown in Fig. 12.

Several attempts have been made to establish iron works in India, along European lines. The earlier attempts, beginning with that at Porto Novo, Madras Presidency, in 1825, were based on charcoal fuel; their failure was due to various causes, but chiefly to lack of fuel, to ill-advised location or design of plant, and frequently to bad management. The only European works to weather the vicissitudes of early life, were those of the Bengal Iron & Steel Co., at Baraker, Bengal, where coke was adopted as fuel.

The Baraker plant first was started in 1874. It passed through various hands and finally was taken over by the present company in 1890. The first steel works in India was started at Baraker by the Bengal Iron & Steel Co., about nine or ten years ago, but the venture failed. The steel plant was abandoned. The company now is operating only its three blast furnaces and its foundries, and is manufacturing cast iron sleepers or railroad ties and cast iron pipe. Its output of these products has varied from 6,000 to 13,000 tons annually. For the past four years, the blast furnaces of the Bengal Iron & Steel Co. have yielded about 40,000 tons of pig iron annually. In 1905, its pig iron output reached the highest point, or about 60,000 tons. The iron which the company does not employ in its own foundries, it sells in the domestic and nearby foreign markets. The stock yard and a view of the blast furnaces of the Bengal Iron & Steel Co. are given in Fig. 5.

The establishment at Sakchi, within the past two or three years of the blast furnaces, steel works and finishing mills of the Tata Iron & Steel Co., has given India its most modern and complete plant. These works have been laid out and built in accordance with the most approved methods of design and manufacture in which the highest American and European engineering skill has been employed.

The operations of these works have been marked by success and the manufacturing costs have been reduced

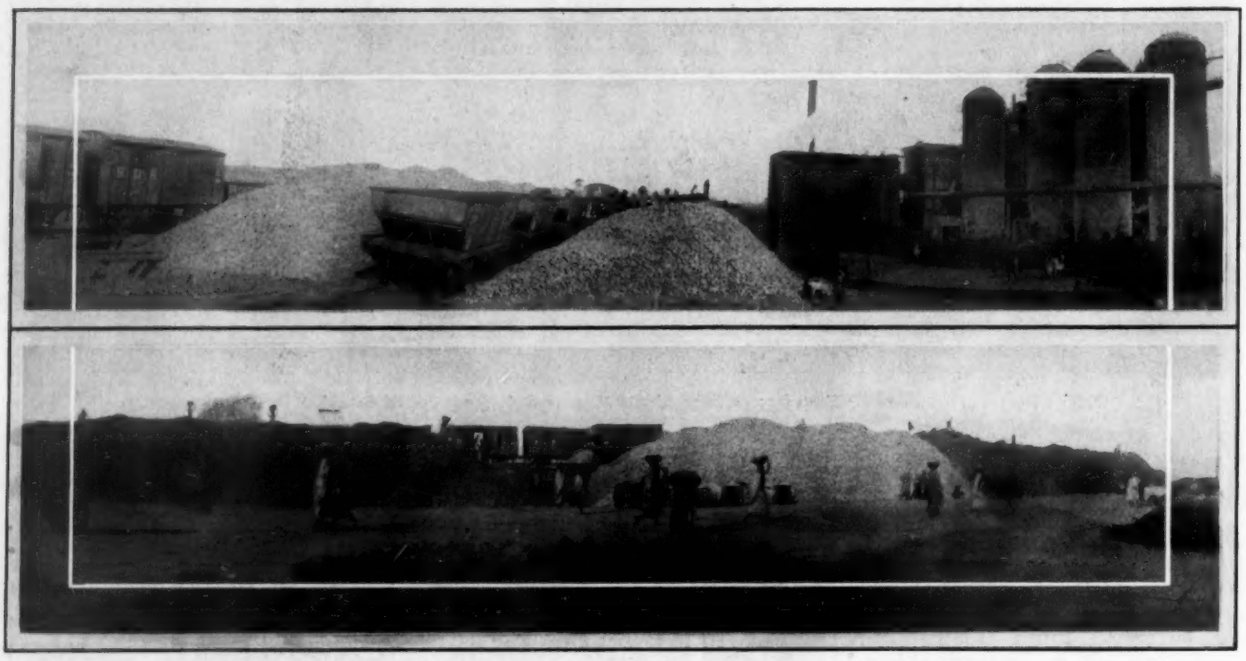


FIG. 5—BLAST FURNACE STOCK YARD OF THE BENGAL IRON & STEEL CO. AT BARAKER, INDIA, SHOWING THE FURNACES ON THE RIGHT

FIG. 6—BLAST FURNACE STOCK YARD OF THE BENGAL IRON & STEEL CO. AT BARAKER, SHOWING NATIVE WOMEN CARRYING IRON ORE AND COKE IN BASKETS BALANCED UPON THEIR HEADS

FIG 7—GURUMAISIMI IRON MINES OF THE TATA IRON & STEEL CO., SHOWING THE NATURAL OUTCROP OF THE DEPOSITS

to a very low figure. Including all charges in the mining, assembling and smelting of raw materials, basic iron today is being produced by the Tata company at a cost of approximately $6 a ton.

The company has not been able, as yet, to get its steel costs to the lowest figure and has experienced difficulty from a shortage of brick for repairing and relining its furnaces. These conditions gradually are changing for the better. It is estimated that the company's ingot cost during the current year will be around $14 to $15 per ton.

The works of the Tata Iron & Steel Co. are located at Sakchi, in the province of Bengal, on the Bengal Nagpur railway, and about 155 miles west of Calcutta. They occupy a site 550 feet above the sea level, which is bounded by the Subernarekha and Kharkhai rivers. The plant, which was described in THE IRON TRADE REVIEW, Sept. 23, 1909, page 545, was designed by an American engineer, Julian Kennedy.

Mr. Perin, as stated, is consulting engineer of the company. There is no American capital invested in the enterprise.

The plant consists of two blast furnaces of 500 tons combined daily capacity; an open-hearth steel works of four 40-ton basic furnaces; a 40-inch, two-high reversing blooming mill; a 28-inch, two-high, reversing combination rail and structural shape mill, with three stands of rolls and an 18-inch bar mill. The first pig iron was made during the first week of December, 1911. The second blast furnace was blown in Sept. 21, 1912. The first steel was manufactured early in 1912 and the first rail rolled March 18, 1912. The bar department was started Oct. 31, 1912, and is operated entirely by native labor. It manufactures merchant bars and also supplies all fish plates for rails rolled on the larger mill. When the plant first was designed, it was calculated to produce about 120,000 tons of pig iron, 100,000 tons of steel ingots and 72,000 tons of finished products annually. In actual operation, it has exceeded these early estimates and its output annually at present is about 150,000 tons of pig iron, 110,000 tons of ingots and 75,000 tons of finished material.

Makes Heavy Rails

The company is a maker of standard rails and now is engaged in the rolling of 100-pound sections for the Great India Peninsula railway and 90-pound sections for the Bombay, Baroda & Central India railroad, according to British standard specifications. A standing order for 20,000 tons of rails annually for the Indian State railways has been placed with the works. The Indian government maintains a testing laboratory at Sakchi, with an English expert in charge. The Tata company has arranged to offer in the United States a portion of its rail output, about 20,000 tons, for the year of July, 1914, to July, 1915, and negotiations now are under way for placing this quantity, particularly for Pacific coast delivery. As stated, the company enjoys a freight rate of about $5 to $6 a ton on both pig iron and finished steel products from Sakchi to the Pacific coast. Three grades of steel are being marketed by the company. That according to British standards, which carries with it a certificate from the government metallurgical inspector; "Bazar" steel or material which falls just outside the British standard

FIG. 8—NATIVE WOMEN AT WORK BEARING FIRE BRICK IN THE STEEL WORKS OF THE TATA IRON & STEEL CO.

FIG. 9—TATA INSTITUTE, THE GENERAL COMMONS OR CLUB HOUSE BUILT BY THE COMPANY FOR ITS EMPLOYES

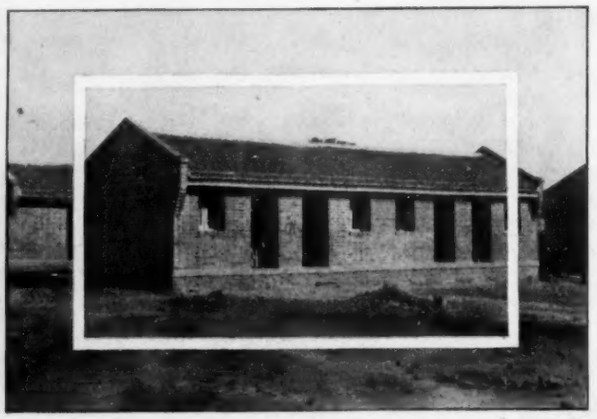


FIG. 10—TYPES OF BUNGALOWS FOR THE NATIVE WORKMEN OF THE TATA IRON & STEEL CO.

specification; and second class or steel slightly defective on the surface. The average phosphorus and sulphur content of the steel made in the year ending July 1, 1913, was 0.037 and 0.027 per cent respectively.

The Tata Iron & Steel Co., through favorable natural mining conditions, is able to place its iron ore in the stock house of its furnaces at the strikingly low figure of ¾ of a cent per unit. The company carries on its books a total charge of 1 cent per unit, this including a very liberal extra allowance. The company obtains this ore from the Gurumaisimi ore mines, which are located about 45 miles by rail or 30 miles by air line from Sakchi. The ore is of high grade hematite character and of non-Bessemer grade, analyzing about 61 per cent in iron natural and about 0.08 per cent in phosphorus. The ore lies on the surface in hills of solid mineral and readily is mined. The production of these mines, in the fiscal year ended July, 1913, was 236,718 tons. It is stated that about 10,000,000 tons of ore are in sight in the Gurumaisimi mines. The general appearance of the Gurumaisimi deposits and how the ore overlies the surface of the ground, are shown in Fig. 7. This illustration is suggestive of the small amount of excavating work required to work the ore. In fact, picks and shovels and baskets in which the mineral is carried to the cars, represent about all the plant that is needed for this work.

Low Freight Rate

The ore is shipped from the Gurumaisimi workings by the Bengal Nagpur railway, which has built a line connecting the works with the mines, exclusively for this traffic. Transportation conditions are especially favorable, since the railroad is down grade all the way and the freight rates are exceedingly low. The ore is carried at a rate of 3 mills per ton per mile. The same rate applies upon all raw materials and upon finished material for export. The company also has a large deposit known as the Dhulli deposit, the location of which is 400 miles from the plant. This deposit is not being worked and is being held as future reserve. Limestone and dolomite are obtained from the company's Panposh quarries, about 100 miles distant. The coal comes from the Jherria mines, about 125 miles from the plant. Sufficient coal from these mines to make a ton of coke is being delivered at the ovens at a cost of slightly over $1 a ton. The coke plant of the company consists of 180 retort non-recovery ovens and 60 beehive ovens, which have a production of about 18,000 tons per month. The last battery of ovens was started in August, 1912. At the present time, a battery of 50 Koppers

FIG. 11—ANOTHER VIEW OF THE WORKWOMEN, SHOWING USUAL METHODS OF BEARING BURDENS UPON THE HEAD

FIG. 12—AN ABANDONED NATIVE FORGE

recovery ovens also is being added to the plant.

The remarkably small labor item of the Tata works is one of the important factors in fixing its low production costs. Recently, there was in the employ of the works a total of about 7,000 natives and 168 Europeans, the latter being Germans, Englishmen and Americans. Among the native employes are included many women who receive as wages 3½ annas or 7 cents per day. All the iron yard work about the furnaces, such as carrying the pigs from the cast house to the stock piles, assorting the iron and loading it upon cars for shipment, is done by the women. An illustration of the strength and hardness of the native women and the part they play in the heavy work of the plant is shown in Fig. 8. These women are delivering fire brick for the open-hearth department and the manner shown of their balancing a heavy load upon their heads, is the usual method of carriage which is adopted by them. It has been computed that one of the women shown in the figure has supported upon her head a weight of 160 pounds of brick.

In Fig. 6, the native women are shown at work in the stock yard of the blast furnaces of the Bengal Iron & Steel Co., at Baraker. The ore, limestone and coke are carried in baskets balanced upon the head in the manner to be noted in the illustration. A closer view of the female worker and her mode of operation is given in Fig. 11. The native women perform in the coal and iron ore mines similar service to that rendered about the furnace plant. The male employes do the actual work of loosening and excavating the mineral, employing such tools as are necessary, while the women follow them with their baskets, pick up the ore and coal and carry it to the railroad cars.

The male native population on the payroll largely consists of common laborers. These are distributed through all departments of the works. It is possible to place some of them in positions of greater dependence than of mere manual service. At the blast furnace, only 10 Europeans and Americans, including the superintendent, now are employed. T. W. Tutwiler, formerly of the South Chicago furnaces of the Illinois Steel Co., is superintendent of the blast furnaces. At first, there were 36 Europeans and Americans in this department, but this number gradually was cut down to 10 for the two furnaces. The native men are on a slightly higher scale of earning capacity than the women, receiving 4 annas or 8 cents daily, as wages.

Skill Required in Open-Hearth Department

The open-hearth department is practically the only portion of the works where native help does not figure largely. The open-hearth crew of the plant is composed entirely of Germans. In the rolling mills, the English predominate in the positions of authority. It has been computed that the total wages of the less than 200 Europeans and Americans engaged in the works is within 15 to 20 per cent of the aggregate sum paid to the 7,000 native workers.

The Tata company has constructed about the works numerous dwellings for its employes and other buildings for public and recreative purposes, to form a town of considerable size. More than 200 buildings have been completed to date. The native help is housed in brick bungalows, a type which is shown in Fig. 10. The roofs of these structures are laid with native tile. More pretentious quarters are provided for the European and American employes. Fig. 1 shows this class of bungalow and their surroundings. The health factor is of much importance, because of the climatic conditions, especially with respect to the Europeans and the company has paid close attention to this subject as well as to the facilities for general amusements and recreation. In the building of the Tata Institute, a view of which is given in Fig. 9, the company has established a commons or club house for the uses of its employes. This building is designed for general amusements. In addition, separate buildings for bowling alleys and for a swimming pool, tennis courts and other opportunities for various sports, have been established. Several race meetings have been held recently for the amusement of the town and it is stated the population has shown much interest in such diversions.

Fluorine Process of Making Steel

BY L GOLDMERSTEIN

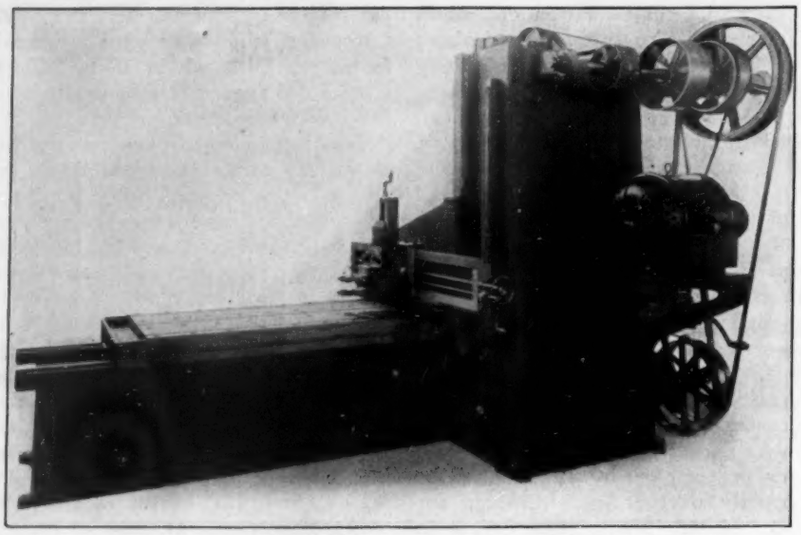
THE development of the fluorine process of steel manufacture has been the outcome of a systematic search for a method of eliminating phosphorus and sulphur from the metal bath. It was clear from the first that, to make such a method certain, the impurities would have to be eliminated not with the slag, where there is always a chance of their coming back into the metal on cooling, but as gases. The next question to be decided was to find an element which would conveniently form gases with phosphorus and sulphur, and at the same time would not be likely to affect the steel undesirably if some of it should remain in the metal. One of the elements satisfying the above conditions is fluorine.

Experiments seemed to indicate that the closer the atomic weight of an element is to that of fluorine, the more stable is its combination with the latter. This practically excluded, as far as the purification of steel was concerned, such elements as sodium, aluminum and magnesium, and left for consideration only fluorine compounds of heavy metals, mainly those of manganese and iron for general purposes, and of nickel, cobalt, chromium, etc., for special alloys.

During many experimental melts with the fluorine combinations of heavy metals it was found that various combinations behave in a different manner. Thus, hydrates decompose slower than anhydrous combinations, and produce a violent reaction when the water of crystallization is liberated by the heat of the metal bath, this being followed by the slower reaction of the salt proper. The fluorides are more stable than the sesquifluorides which possess one atom of fluorine too much, and appear to be in a state of somewhat unstable chemical equilibrium.

When the proper fluoride is introduced into the metal bath, it decomposes, partly under the influence of the heat, and partly owing to the presence of the metal which apparently acts as a sort of catalizer. The break-up of the salt liberates the fluorine which instantly combines with those elements for which it has the greatest affinity, among them being phosphorus and sulphur. It is well, however, to bear in mind that fluorine has also a great affinity for silicon. The combination of fluorine and sulphur, and fluorine and phosphorus are gases at the temperature of molten steel, and as such rapidly escape from the metal bath so that they

(*Continued on page* 182b.)



PLANER FOR INSTALLATION ON SHIPBOARD

Marine Type Planer

The accompanying illustration shows an open side planer built by the Cleveland Planer Works, Cleveland, for installation on the United States torpedo boat destroyer, tender No. 2 Melville. It is similar to the standard open side planer except that its height overall is 8 feet 5 inches, this being 16 inches less than the standard height for a 36-inch machine. The planing height has not been reduced. The bed of the machine is provided with bolt holes for anchoring the tool to the floor of the ship. The motor which drives the planer was built by the Reliance Electric & Engineering Co., Cleveland, according to special government specifications.

Seventy Year Old Lathe

The persistency with which old machine tools often put off the consignment to their ultimate destination, the scrap heap, is well illustrated in the sale recently of a lathe which had seen nearly 70 years of active service. As the machine, when sold, was in comparatively good condition, it is entirely a matter of conjecture as to how much of its history lies in the future. The lathe was designed and made at the plant of Cyrus Currier & Sons, Newark, N. J., about 1845, by Cyrus Currier, who was the grandfather of the present Cyrus Currier. The making of the patterns and castings was supervised personally by the original Mr. Currier and all the machining was done at the plant. Much of the work was done by hand, the bed being chipped and filed. The lathe had a swing of 50 inches and a 17-foot bed, and weighed about 3,000 pounds. Originally the carriage could be fed only 6 inches at a time; at intervals, therefore, it had to be shifted on the bed. Some 30 years ago a feed screw was fitted.

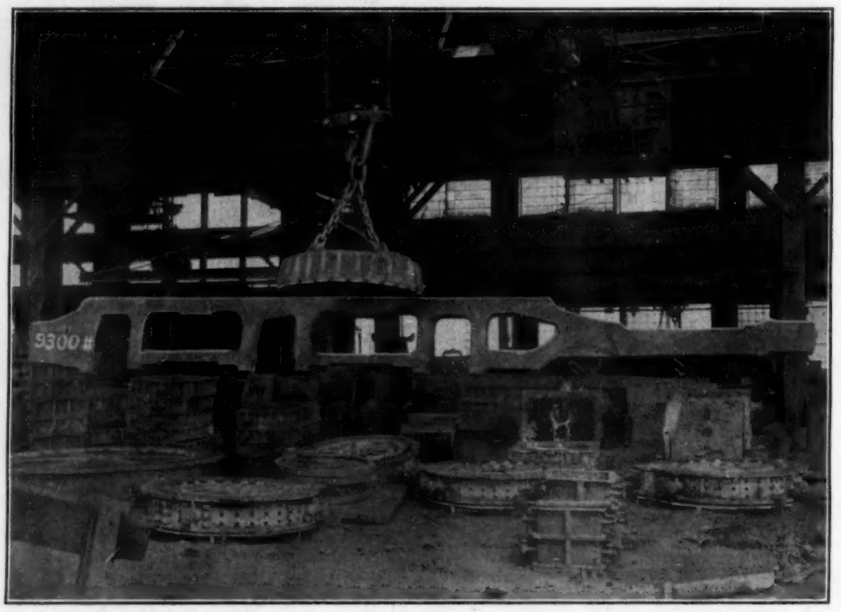
About two months ago the Currier company, requiring space for some new machinery, decided to waive questions of sentiment and move the old lathe from the building in which it had stood for nearly seven decades. Accordingly it was disposed of as a second hand machine to the Prentiss Tool & Supply Co., Singer building, New York. The latter company soon found a buyer for it and in the early part of May it was loaded aboard a boat for shipment to a machine shop in South America. The invoice which accompanied it described the lathe as follows: "50 inch x 17-foot lathe, compound rest and screw feed, solid spindle, steady rest, tight and loose pulley countershaft. Old style lathe."

It is interesting to note that the Currier company in the latter part of April, this year, disposed of a 30-inch by 6-foot metal planer, which also was made about 1845. A considerable portion of the work of building this machine was done by hand. Last winter the company sold a 6-inch crank shaper which also was made about the same time. Neither of these tools is yet in the scrap heap, both having gone to small shops in Newark, where they are now in operation.

Lifting Magnet in Foundry

The accompanying illustration shows the 63-inch lifting magnet handling a vanadium steel locomotive frame weighing 9,300 pounds in the shop of the Ohio Steel Foundry Co., Lima, O. Twenty-eight frames similar to the one shown in the illustration were furnished to the Lima Locomotive Corporation for 14 locomotives built for the Delaware, Lackawanna & Western railroad. The magnet is also used for shaking castings out of steel flasks and for handling the hot castings from the shake out heap to the cleaning department. The magnet is handled by a special crane which was constructed by the Toledo Bridge & Crane Co., Toledo, O. In addition to carrying the magnet, the crane is equipped to handle a Hayward three-line 1½ cubic yard grab bucket. The magnet was furnished by the Cutler-Hammer Mfg. Co., Milwaukee.

The Pump & Brass Works, Medicine Hat, Alta., Can., George E. McDonnell, manager, is making extensions.



LIFTING MAGNET HANDLING LARGE LOCOMOTIVE FRAME

Taylor System at Franklin Plant

Second of Three Articles Dealing With the Results of Scientific Management in an Automobile Factory

BY G D BABCOCK

(Continued from THE IRON TRADE REVIEW, June 4.)

THE illustrations which follow and upon which this discussion rests are the exact records of our accomplishment over the periods as shown. No values are shown other than by the curves for comparison, but the plottings have been arranged in such a manner that a study of the curves alone should anticipate any discussion.

In Fig. 2 we show the method of moving materials on ground floors. Concrete pits are sunk in the floors and properly guarded. An electric transportation truck runs into the pit with its platform level with the floor. The truck man lifts the material from the floor with a power hand truck and runs the load onto the electric truck; he then withdraws the hand truck, runs the electric out of the pit to the new destination where it either goes into another pit on the ground floor, or to an elevator, Fig. 3, if for the upper floors. The load is handled from the elevator much upon the principle that the elevator becomes a pit. The electric runs in with its side to the sill. The elevator is operated to raise the truck to the particular floor level on which the load is to be delivered. The load is then removed to the floor with a power hand truck, and the elevator lowers the electric to the ground floor and releases it. The elevator man returns at his first opportunity and delivers the load to its proper place.

In addition to this the labor of the movement has been very much lightened, and one man can deliver a thousand pounds from stores to any place in the works with greater rapidity and ease than he could carry a pail of water over the same path. The lack of fatigue of the move-man allows a high rate of travel throughout the day. Where before move-men would ignore a pile of heavy material until they were forced to carry it, now they take whatever comes as it comes.

FIG. 2—HOW MATERIAL IS MOVED ABOUT THE PLANT

Production Records

In Fig. 4 is shown the summary of the work's effort over the period of May, 1908, until the end of March, 1914. To date the highest total of cars produced occurred in 1909-10, when the models were small and relatively free from complications of electrical equipment, fine accessories, etc. It was also the period of the introduction of the automobile and altogether was a period of heavy production.

However, mechanical equipment and scheme of control of the industry at the time necessitated an extraordinary effort to accomplish the results. This is shown by a study of the "producing hours per car" curve and the "number of men employed". The "producing hours per car" was found by dividing the direct labor car cost of a particular lot of cars by the average direct labor rate over this period of production.

The large dip in 1910 of the "producing hours per car" can be accounted for by the fact that a considerable amount of production was performed on expense orders, which costs did not appear in the direct labor car cost.

A further study of the curve will show that the men employed have been relatively constant since the first of July, 1912, although the cars produced have varied considerably. The extraordinary drop in the "producing hours per car" over this period was caused by the new control plan of lot production which went into effect on the first day of February, 1912.

A paper presented at the Worcester meeting of the National Machine Tool Builders' Association, April, 1914.

The 1911 effort of men employed peaked very seriously and at an alarming rate. The planning and supervising expenses behaved in the same manner and it was altogether a period of violent peak load. Since that time the supervising and direct labor expense has remained practically constant, over not only the continuation of that season's product, but also over the time of building of practically a new car in all of the essential mechanical details, beginning with Sept. 1, 1913.

The extraordinary rate of fall of "producing hours per car" of the 1914 car, as shown, is due to the absolute control of our productive effort in bringing a new model in a matter of two or three months into the general class of low cost, although starting initially with somewhat of a high cost. This control has been due to two prime reasons: First, a good plan of supervision; second, simplicity of product, and third, new and more applicable machinery and tools. At the time of the drop of the "producing hours per car" of 1913, we had no change of any kind in form or in number of models to produce (and we were producing four chassis types) or any other feature except the lot plan of production.

Over this period, from 1908 to 1914, the direct labor rate per hour is shown starting in 1908, with 23.2c per hour, average for all men employed in the motor car department, up to 30.1c per hour in 1914. The raised flat portions are caused by premium work and

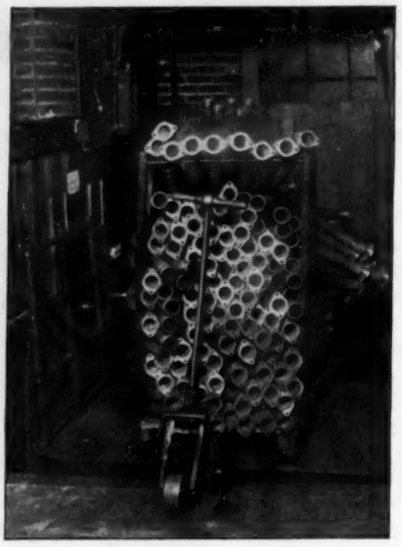


FIG. 3 — ELEVATOR FOR HANDLING TRUCK LOADS OF MATERIAL

steady earnings under it. The broken portions are due to an irregular flow of work with consequent uncertain premium earning. In 1904 the average rate per hour was 20 cents.

The shipping of the product has practically always followed close on production and we have consistently tried to produce the maximum quantity of which our works was capable.

The relation of the direct labor and expense accounts is well shown by Fig. 6. It will be noticed from the direct labor and overhead expense curve that the moneys paid into the community have remained relatively constant from May, 1912, until at the present time, although the producing hours per car, as shown by Fig. 4, has been materially reduced; in other words, we are maintaining continuously a full plant production and our savings by economies which we make are filled with new product.

One of the common ways of studying the relation of direct labor to indirect labor is by percentage and since large expense is frequently discussed with the problem of installing scientific management, it is interesting to note how little apparent influence the cost of this work has had upon expense. In Fig. 4 the curve of planning and supervising expense is very rough over the months from May, 1913, to March, 1914. The cause of this is that expense was added to plan for some particular saving and as soon as consummated the expense again dropped.

In Fig. 5 is shown the percentage of overhead or indirect labor to the direct labor. It will be noticed that in January, 1912, it was approximately 125 per cent, although at the latter end of the period somewhat under this.

By reference to Fig. 4 it will be noticed that the curve of cars produced monthly in the beginning of the 1909 period, and the 1914 period to date is closely comparative. In Fig. 7 this comparison is direct. Here it will be noticed that the productive quantity and rate of cars for 1909-14 are very similar except at slightly different periods. The 1909 workmen employed is high in quantity and rate

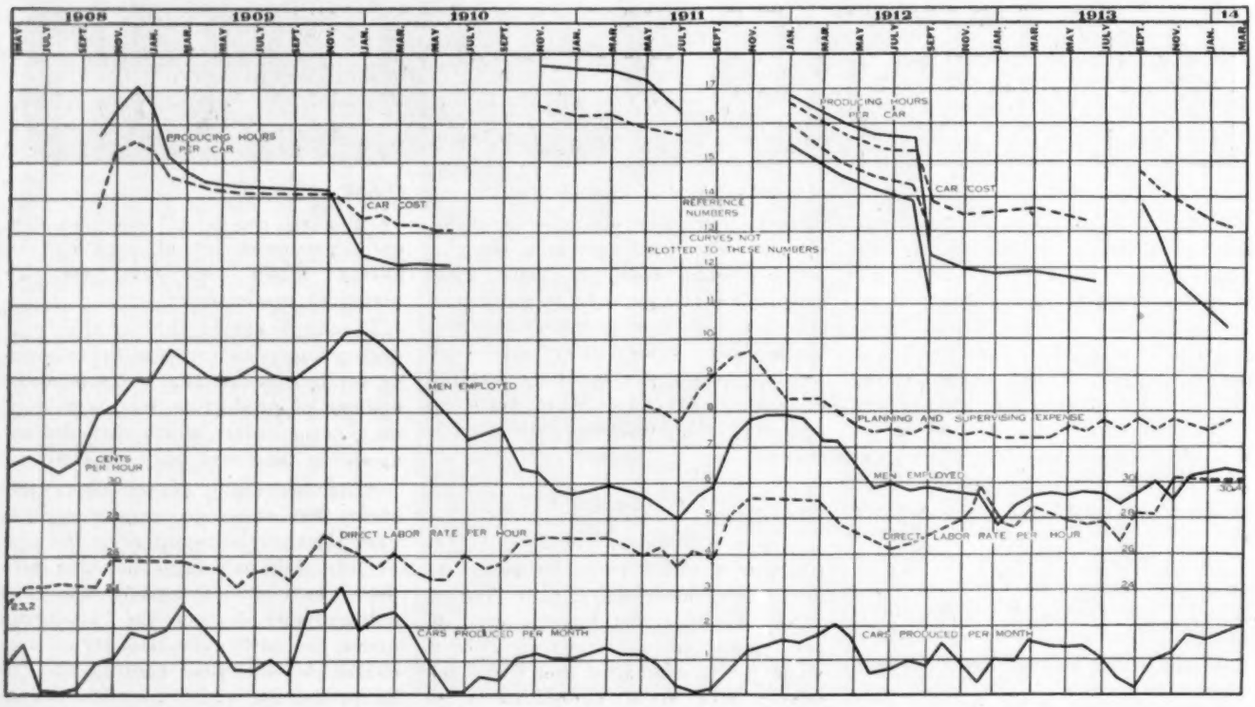


FIG. 4—PRODUCTION RECORDS FOR SIX YEARS

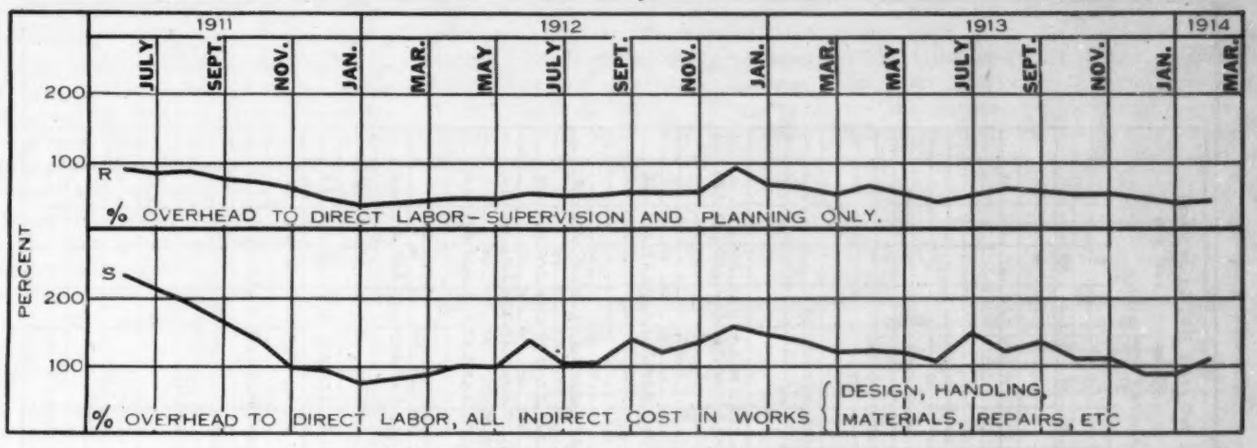


FIG. 5—RATIO OF OVERHEAD TO DIRECT LABOR

of acceleration, with a very irregular employment of men as indicated by the number of points which fall away from the average line. The 1914 workmen are low in quantity, steady in employ and uniform in acceleration for practically the same effort. The 1909 wage rate and the 1914 wage rate show a very marked difference, as well, also as does the producing hours per car. The relative effort required on the models is shown by the illustrations as part of the figure.

Of the factors discussed for this period, it will be noticed that production effort for a better product has been materially reduced; that rate of wage of workmen has been materially increased; that peaks of labor employment have been eliminated, and the price of the car to the trade has been very materially reduced.

Up to a very recent time professional time study has not affected any of these results. Time for the control plan or premiums has been either estimated from previous performances or from coarse time study made.

Time Studies

The conduct of the time studies and of the results accomplished under them which are shown in Figs. 8, 9 and 10 has been handled and commented upon as follows by Dwight V. Merrick, consulting engineer, who is directing this phase of the work for the writer: "In making a time study a skilled and willing workman should be selected in order to get the most accurate results. It is essential to carefully analyze the job to be observed, write down the different elements in the order in which they should be done before starting the study. For convenience a stop watch graduated in minutes and decimals of a minute, the hands of which may be stopped and started without setting them back to zero is used. A special observation sheet is used with one wide column for the various elementary parts of the job, followed by several narrow columns for recording successive times of each elementary observation.

"The stop watch is allowed to run continuously and at the end of each operation a record is made of this operation. Later the elapsed times are interpolated showing the time for each operation that has been observed. These elapsed times are averaged and placed at the end of the line, and what is known as the minimum time is selected for each operation and is placed in the column headed 'Minimum Time'. In this selection great care and judgment is required and there is always the danger of the personal element entering into it, both

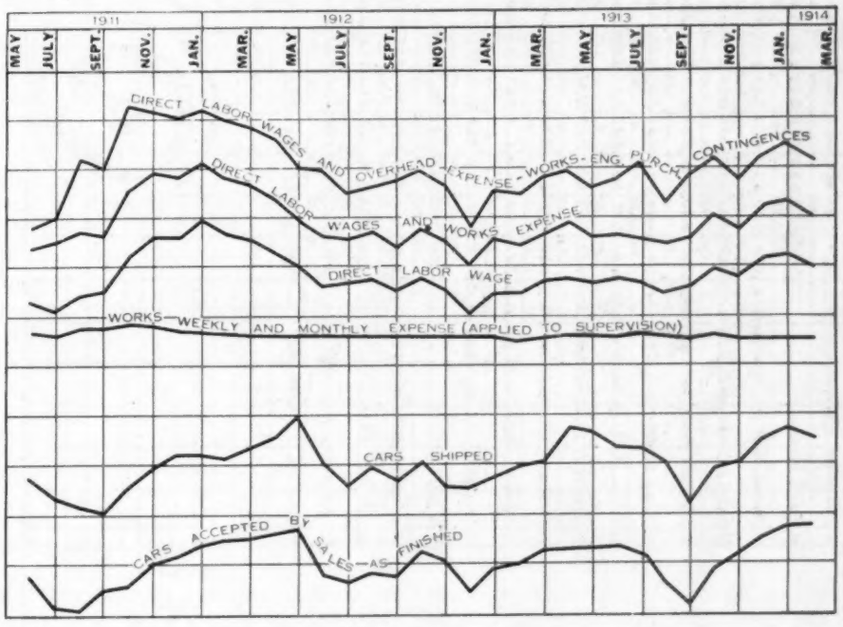


FIG. 6—FLUCTUATION IN WAGES, OVERHEAD EXPENSE, ETC.

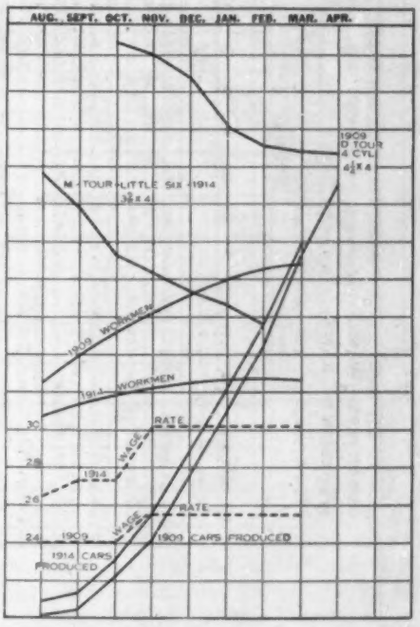


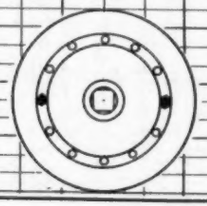
FIG. 7—COMPARISON OF PRODUCTION WITH WAGE RATES

OBSERVER'S NAME Morss MACHINE NO. 59 V. DATE 2-21-1914
WORKMAN'S NAME Turner #5617
PIECE 19398 - 26 DIFFERENTIAL GEAR SECTION

STUDY A

DETAILED OPERATIONS	1	2	3	4	5	6	7	8	AVER	MIN TIME
1 Carry gears from pile to bench						.09	5.41			
						.16	.17			
2 Pick up Diff. gear & put in vise + tighten	.15	.16	.17	.12	.16	.25	5.58	.16	.156	.12
	.63	.57	.73	.58	.56	.61	.65	.11		
3 File corners off Cap Screws	.58	.73	.95	.70	.78	.87	9.23	.87	.620	.50
	.07	.11	.06	.12	.07	.10	.11	.11		
4 Loosen Vise, turn Diff. tighten (vise)	.65	.84	.99	.97	.85	.97	9.34	.98	.0775	.07
	.53	.65	.74	.18	.56	.52	.83	.36		
5 File Cap Screws	1.18	1.49	1.73	1.15	1.40	1.54	9.77	1.33	.523	.41
	.07	.09	.07	.08	.09	.11	.07	.08		
6 Loosen Vise, turn Diff. tighten (vise)	1.25	1.57	1.80	1.23	1.49	1.65	9.84	1.41	.0813	.07
	.35	.25	.41	.37	.37	.40	.11	.44		
7 File Cap Screws	1.53	1.85	2.21	1.58	2.00	2.25	10.05	1.85	.395	.30
	.06	.05	.08	.10	.09	.12	.07	.03		
8 Open Vise	1.59	1.90	2.29	1.68	2.09	2.37	10.12	1.93	.035	.07
	.11	.09	.07	.08	.14	.11	.05	.11		
9 Turn Diff. 90° tighten Vise	1.70	2.02	2.36	1.76	2.23	2.48	10.17	2.04	.095	.09
	.30 (clamp)	.45	1.76	1.46	1.58	1.58	1.76	1.53		
10 Wipe grease off Diff. Gear edges	2.00	2.47	4.12	3.20	3.52	4.06	11.93	3.57	2.60	.32
	.76	.03	.69	2.03	1.43	1.46	1.36	1.02		
11 Pick up Gear wipe off grease	2.28	2.93	4.61	5.23	5.45	5.78	13.32	5.59	.524	.43
	.07	.13	.13	.16	.21	.16	.06	.06		
12 Sand Gear on Differential	2.35	3.06	4.74	5.42	5.23	5.88	13.46	5.67	.105	.08
	.06	.11	1.31	.65	.98	.10	.53	.37		
13 Align holes in Gear + Diff.	2.81	3.76	6.05	5.87	5.66	6.08	13.99	6.04	.558	.45
	.37	.13	.15	.23	.23	.13	.22	.17		
14 Assem 1st 7/16 Cap Screw + Nut	3.18	3.89	6.20	6.10	5.88	6.21	14.19	6.21	.264	.22
	.53	.23	.23	.20	.22	.21	.33	.54		
15 Assem 2nd 7/16 Cap screw + Nut	3.52	4.12	6.53	6.30	6.10	6.56	14.52	7.35	.294	.22
	1.00	.53	1.05	.88	.98	1.02	.69	.33		
16 Tighten Nuts with Wrench (and)	4.61	4.75	7.58	7.18	7.08	7.58	15.21	8.17	.895	.72
	.16	.11	.02	.09	.10	.03	.12	.10		
17 Loosen Vise, turn piece end for	4.77	4.86	7.60	7.26	7.18	7.66	15.33	8.27	.0963	.08
	.02	.03	.04	.05	.03	.01	.02	.03		
18 Tighten Vise	4.79	4.89	7.64	7.29	7.21	7.69	15.34	8.30	.0363	.03
	1.68	1.11	1.81	.45	.50	.20	1.75	.26		
19 Align rivet holes with Drift	6.45	6.00	9.45	7.74	7.71	7.89	17.09	8.56	.103	.83
	.03	.01	.09	.04	.03	.02	.03	.01		
20 Loosen Vise	6.48	6.01	9.54	7.78	7.74	7.91	17.12	8.57	.030	.03
	.10	.05	.20	.18	.18	.10	.11	.10		
21 Sand Assem in Box	6.58	6.06	9.74	7.96	7.92	8.01	17.23	8.67	.125	.10
	.18	.12	.19	.11	.11	.11	.09	.12		
22 Return to Bench	6.76	6.18	9.93	8.07	8.03	8.12	17.32	8.79	.126	.10

Average Total Time 8.69



OBSERVER'S NAME Hawksworth MACHINE NO. 106 V DATE 3-30-1914
WORKMAN'S NAME Timian #334 D3M 8th A.M.
PIECE 19398 - 32 DIFFERENTIAL GEAR SECTION

STUDY B

DETAILED OPERATIONS	1	2	3	4	5	6	7	8	9	10	AVER	MIN TIME
1 Pick up Diff. Gear and (vise + tighten)	.18	.17	.17	.15	.20	.17	.13	.20	.19	.21	.151	.15
2 Wipe grease off Diff. Gear Cap (screws + flange)	1.58	1.03	1.21	1.57	.98	1.68	1.36	1.18	1.36	.81		
	1.72	2.20	1.38	1.72	1.08	1.30	2.04	1.52	1.38	1.12	1.27	1.05
3 Hand Gear on Differential	.99	.66	.93	.66	.50	.33	.34	.56	.58	.66		
	2.21	2.66	1.83	2.13	1.58	1.64	2.38	2.05	2.37	1.58	.506	.45
4 Put 2 5/16 Cap screws in Gear (+ Diff.)	.10	.30	.27	.23	.13	.16	.13	.18	.18	.13		
	2.40	3.00	2.10	2.46	1.76	1.80	2.56	2.27	2.36	1.76	.216	.17
5 Start 2 Nuts by hand	.34	.24	.23	.25	.24	.31	.26	.22	.38	.40		
	2.72	3.24	2.43	2.71	2.80	3.11	3.01	2.79	2.95	2.16	.415	.33
6 Tighten Nuts with Wrench	.33	.27	.44	.29	.33	.45	.25	.49	.31	.11		
	3.05	3.51	2.87	3.00	2.93	3.33	3.26	3.19	3.26	2.27	.305	.25
7 Loosen Vise, lay Assem on (Bench)	.15	.12	.10	.16	.18	.08	.09	.01	.03	.09		
	3.20	3.63	2.97	3.16	3.03	3.41	3.35	3.36	3.34	2.36	.099	.07
8 Test holes for align. using (Rivet)	.18	.20	.52	.30	.47	.21	.27	.24	.23	.16		
	3.38	4.53	3.52	3.40	3.70	3.62	3.62	3.90	3.57	3.02	.471	.40
9 Lay Assem on Box	.16	.13	.16	.11	.11	.11	.10	.10	.14	.15		
	3.43	4.66	3.68	3.51	3.81	3.73	3.72	4.00	3.97	3.17	.115	.09

Average Total Time 3.77

NOTE 1 We need 2 hardened taper Punches to be used to align Gear with Differential when assembling Gear to same. OK by J.L.B.

NOTE 2 Use Punches 19398 PT. on this part of assembly.

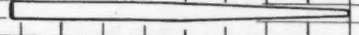


FIG. 8—RESULTS OF TIME STUDIES ON A DIFFERENTIAL GEAR

on the part of the observer and the operator.

"On the assumption that the operator works uniformly it has been observed that the minimum time for each operation runs about the same percentage below the average for each elementary operation. The reason that the minimum time rather than the average time is selected can be accounted for in several ways:

"*First.*—The quickest time desired for each elementary operation in order to have a time that can be equalled only by the best workmen.

"*Second.*—Whenever these elementary operations are of such a nature that they can be considered as standard a record is made in such a way that they become ready reference.

"These elementary operations may occur in a great many different classes of work, and the percentage that is added for rest and unavoidable delays varies with the different conditions under which they are used. The percentage for rest and unavoidable delays is a very important item and is arrived at after a very exhausive study.

Differential Gear Section

"In study *A*, Fig. 8, the operator had been given no instructions. Study *B* represents a study after the instructions had been given by time study man. Operation 1, study *A* was eliminated in study *B* by having the material placed on the bench by a moveman. Operations from 3 to 9 in study *A* were combined in operation 2, study *B*. The man was instructed to do all burring with the differential clamped in vise after he had wiped off the grease. This eliminated loosening and tightening vise three times. In study *A* up to and including this operation the time consumed runs about four minutes, and in study *B* to this same point the time consumed was a little less than two minutes. Operations 11, 12, 13, study *A* was merged into operation 3 in study *B* by using the punches referred to in second foot note on observation sheet.

"Operations 14 and 15, study *A*, are practically the same as 4 and 5 in study *B*. Time is saved by putting two cap screws at a time in piece. Operation 16 in study *A*, and 6 in study *B*, are similar. Time is saved in *B* by using a proper kind of wrench. Instead of loosening vise, turning end for end and tightening vise again, as shown in operations 17 and 18, in study *A*, the man is instructed to loosen vise and lay piece on bench, as shown in study *B*. Operation 19, study *A* is eliminated in study *B*, and is taken care of by operation 3. Note the use of the punches. In operation 8, no aligning is needed at this point; holes are tested for alignment with rivets only. Operation 20 in study *A* is done away with for the same reason as described above for operations 17 and 18. Operation 21, study *A*, is the same as 9, but the time differs for the reason that the studies were taken on different men. Operation 22, study *A* was eliminated for the reason that the man left his pieces on the bench and did not have to take them back to the bins. This was done by the movemen.

"An instruction card, Fig. 9, is made out from study *B* on a form provided for the purpose. This gives the detailed instructions to the operator with the time for each itemized operation which makes up the assembly of the bevel gear to the differential. This is summed up and a percentage is added for rest and unavoidable delays and is the time allowed for each assembly. Besides this there is a certain amount of time allowed for preparation which is also itemized on

INSTRUCTION CARD

FORM A-1152—MFR.

	DETAIL INSTRUCTIONS	SYMBOL OF TOOL	CUTS NO.	CUTS DEPTH	FEED AM'T	FEED SYMBOL	SPEED R. P. M.	SPEED SYMBOL	TIME WORK SHOULD TAKE
1							(PREPAR)		
2	Change card at window							2.00	
3	Return to work							.50	
4	(Assemble Bevel Gear to Differential)								
5	Select Tools							2.00	
6	Take Diff. from bench, land in vise, tighten								.15
7	Wipe off grease, burr CapScrews & Flange								1.05
8	Assemble Gear to Diff. (use punches 19398 (PT))								.45
9	Put two 5/16 Cap Screws in Gear & Diff.								.17
10	Start two nuts by hand (one at a Time)								.33
11	Tighten nuts with wrench								.25
12	Loosen vise, land assembly on bench								.08
13	Test holes for alignment (use rivet)								.40
14	Remove assembly to tote box								.09
15	Get card signed							2.00	
16	Take to window							.50	
17								7.00	
18	Allowances for rest & unavoidable delays							2.00	
19	Preparation							9.00	
20									2.97
21	Allowances for rest & unavoidable delays								1.03
22	Time per piece								4.00
23									
24	Lot size 37 X 4 (Time per piece)								148.
25	Preparation for lot								9.
26	Time for lot								157.
27	Premium								262.

WHEN WORK CANNOT BE DONE AS SHOWN, REPORT MUST AT ONCE BE MADE TO MAN WHO SIGNED THIS CARD. DATE 4/21/14 SIGNED W.B.H.

SKETCH.

PER PIECE | PREP'N | TIME FOR HIGH RATE | HIGH RATE | LOW RATE | LEADER'S BASE RATE | HELPER'S BASE RATE

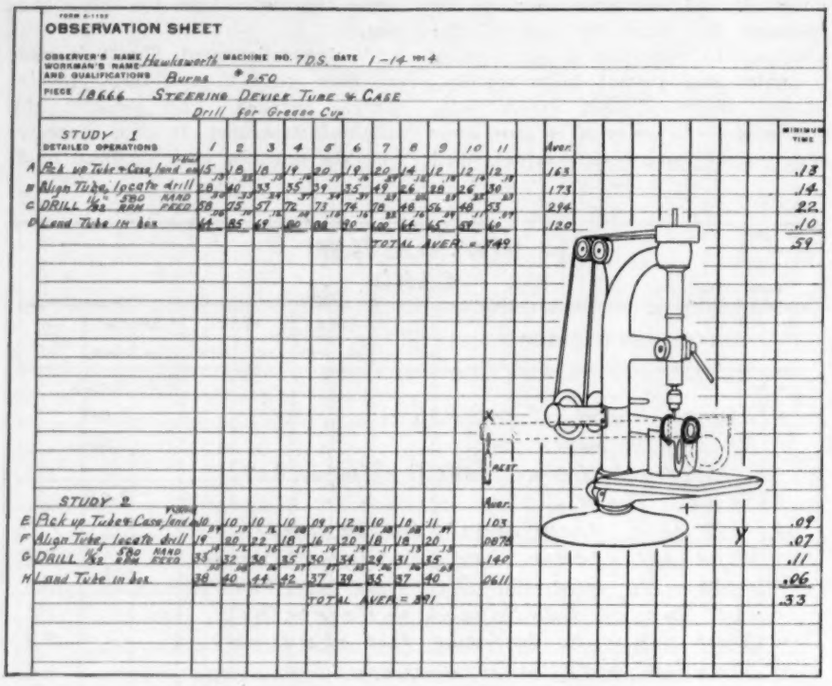
MATERIAL SPEC. | CLASS NO. 406V | BCH. NO. D3M | LOCATION | OPER'S NO. 1

Assemble Bevel Gear to Differential

NAME OR SYMBOL OF PIECE: DIFFERENTIAL GEAR CASE PUSTCRA 20M

DWG. NO. 19398

FIG. 9—INSTRUCTION CARD DEDUCED FROM TIME STUDY SHOWN IN FIG. 8



OBSERVATION SHEET

OBSERVER'S NAME Hawkesworth MACHINE NO. 705 DATE 1-14 1914
WORKMAN'S NAME AND QUALIFICATIONS Burns #250
PIECE 18666 STEERING DEVICE TUBE & CASE
Drill for Grease Cup

STUDY 1

DETAILED OPERATIONS	1	2	3	4	5	6	7	8	9	10	11	Aver.	MINIMUM TIME
A Pick up Tube & Case, land in V-block	15	18	18	19	20	19	20	14	12	12	12	165	.13
B Align Tube, locate drill	28	40	33	35	39	35	49	26	28	26	30	173	.14
C DRILL 7/32 STEP AND HAND FEED	58	75	57	72	73	74	78	48	56	48	53	294	.22
D Land Tube in box	44	85	49	80	88	90	100	66	65	57	60	120	.10
							TOTAL AVER. = 749						.59

STUDY 2

E Pick up Tube & Case, land in V-block	10	10	10	10	09	12	10	10	11			103	.09
F Align Tube, locate drill	19	20	22	18	16	20	18	18	20			0878	.07
G DRILL 7/32 STEP AND HAND FEED	33	32	30	35	30	34	29	31	35			140	.11
H Land Tube in box	38	40	44	42	37	39	35	37	40			0611	.06
							TOTAL AVER. = 391						.33

FIG. 10—TIME STUDIES ON DRILLING OPERATIONS

this card and a percentage is added for rest and unavoidable delays. This instruction card is a permanent record of this method of assembly and is constantly referred to by all to whom it may concern.

"In study 1, Fig. 10, the man had no specific instructions. In operation *B* he put his piece on the V-block, as shown by the dotted line, standing in front of machine at position *Y*. To align the piece to drill he had to step to position *X*, then back to *Y*, to operate machine.

"In study 2 he was instructed to put his piece on machine as shown in full line and this enabled him to align the piece without moving from position *Y*. Owing to the fact that he did not have to move his position he was able to work to a better advantage with the results of cutting his time almost in two."

Figure 11 will show the effort on the rear axles with respect to cost, producing hours, labor rate and also the influence of time study upon the certainty and uniformity of total productive effort. The numbers at the bottom of the sheet show lots finished and are plotted on a time sheet under the date at which each lot was finished. The lots are all of the same size.

It will be noticed that direct labor costs dropped rapidly from lots 1 to 4, then maintained a steady period for 4, 5, 6 and 7; dropped again at 8, at which time study was started. They dropped again at 9, when the men worked under their first instruction cards. They were raised again due to noisy gears which required a considerable amount of extra labor and settled again to practically a constant figure, approximately one-half of the original steady cost. The frequency with which the lots were finished rapidly as the cost and producing hours per lot is lowered.

Eight workmen to a group are employed continuously on this axle assembly and the rate of increase of workmen's earning as shown is the average for the men in one group. This shows a rise of from 26 to 29 cents up to which time study had not been started and the increase of rates from 26 to 29 did no more than increase the cost of the product, as will be noted by the cost curve. The time studies corrected this, and it is well to know that the time studies were corrections of effort rather than increase of speed.

How Speed is Obtained

The speed attained was due primarily to the fact that the workmen always made the same and most efficient effort in the same way, and of course becoming habitual it necessarily became easier and more rapid. Making a quicker decision as to quality of noise furnished one man a 33 per cent increase in wage.

Fig. 12 is a study of time, cost and wage rate on a large assembly, the front axle. This in design and productive effort has remained practically constant over the periods as shown. The points plotted for 1911, 1912 and 1913 are the averages for the whole year's work. The marked drop between 1912 and 1913 in cost and producing hours will upon inspection be found to agree with the average drop in producing hours per car over the same period as shown

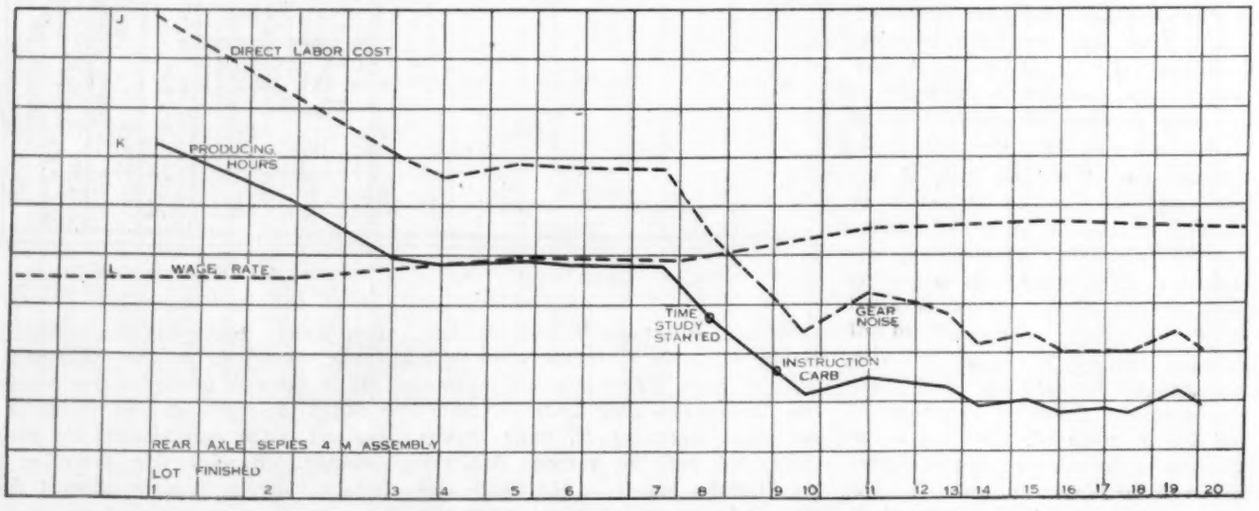


FIG. 11—RESULTS OF TIME STUDY ON A REAR AXLE ASSEMBLY

in Fig. 4, and illustrates as mentioned previously the effect of the control plan with lot production. Between 1913-14 the increase of cost is due to increasing rate of labor, and from 1914 on the gradual decrease due to results of time study; the rate per hour of labor also increasing.

Uncle Sam's Attaches

Will Work to Increase Foreign Trade of U. S.— Appointed by Secretary Redfield

Washington, July 21.—Announcement by Secretary of Commerce William C. Redfield of commercial attaches to be sent to United States legations for the purpose of promoting foreign trade of this country will be made in two or three weeks. This statement was made to The Iron Trade Review representative by A. F. Baldwin, chief of the Bureau of Foreign and Domestic Commerce, under whose direct supervision the attaches will work.

The provision for naming these attaches is contained in the legislative, judicial and executive appropriation bill, which passed Congress last week.

It was at the suggestion of Secretary Redfield that the provision for commercial attaches was incorporated in the bill, it having been in line with a recommendation of the Department of Commerce for the coming fiscal year. The enactment of such a provision is an innovation, marking the first time that the United States has sought to expand its foreign commerce through this method of personal representatives. The attaches and their clerks will be stationed at some 10 legations, and their duties will be confined exclusively to promoting foreign trade of this country. At the recent National Foreign Trade Convention held in this city, this plan was approved in a set of resolutions. Among those who commended it warmly was President James A. Farrell, of the United States Steel Corporation.

It will be the duty of the commercial attaches to travel through the countries in which they are situated, study carefully the commercial and industrial conditions and watch for trade opportunities, act as agents in bringing to the attention of the foreign countries the products of the United States, with their superior qualities, and to persuade those contemplating purchases to get their products from this country. Reports will be made regularly to the Department of Commerce, and in turn the latter will inform manufacturers of this country of the opportunities abroad.

It is proposed to establish the commercial attaches and their clerks at such prominent legations as those at London, Paris, Tokio, Berlin, Buenos Aires and St. Petersburg. If the plan proves as successful as expected, the number of attaches will be increased from year to year through greater appropriations.

The appropriation in the bill of this year calls for $100,000. It is estimated that the cost at each legation for this purpose will be $10,000 yearly. This will include the salaries of the commercial attaches, which are left at the discretion of the Secretary of Commerce, the salaries of the clerks, one to be named for each attache, at an annual salary of not exceeding $1,500, traveling expenses, rental and related expenses.

Mr. Baldwin said that only attaches of practical commercial experience will be named, and that the attaches must be able to speak the language of the countries to which they go.

"They will be thoroughly fitted for the service," said Mr. Baldwin, "and you may be sure they can't be amateurs to perform the responsible duties which will rest upon them."

While the plan to promote United States foreign trade through commercial attaches was generally approved in Congress, there was strong attack made against the fact that the making of appointments was taken out of the classified service. Republicans condemned this as a return to the spoils system. As it is, it lies wholly within the power of the Secretary of Commerce to make the selections, "at his own discretion". A departmental test is provided, and may or may not be made, as the secretary sees fit. It was said by Mr. Baldwin that examinations will be required of the candidates by Mr. Redfield. Republicans held this feature of the provision is a mere subterfuge and permits of political domination in making up the personnel of the attaches and clerks. Strong contention was also made that the salaries of the attaches should have been specified in the bill.

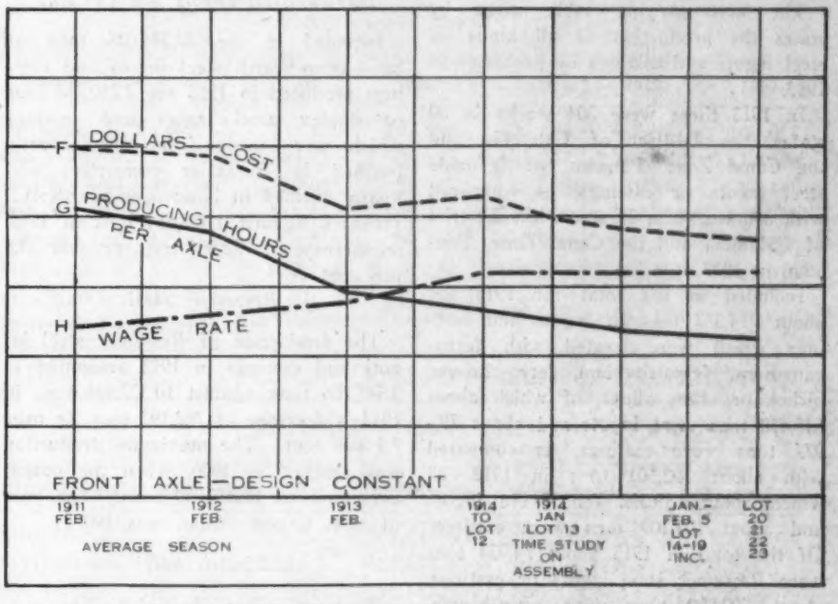


FIG. 12—RESULTS OF TIME STUDY ON A FRONT AXLE ASSEMBLY

Enamel Company Will Build Factory

The Enamel Products Co., Cleveland, making enameled signs, stove parts, refrigerator linings and other specialties, has acquired 4½ acres at Eddy road and Taft avenue N. E., on the Cleveland belt line, near the Chandler Motor Car Co., and the William Dunbar Co. has been awarded the contract for the erection of a new factory, 80 x 280 feet, from plans prepared by the Albert M. Allen Engineering Co. The plant, to be ready Oct. 1, will be one of the most complete of its kind. Officers and directors are: President, W. B. Hickox; vice president, C. W. Blossom; secretary and treasurer, J. Foster Jr., A. T. Chisholm, C. S. Dangler, George J. Feiss and W. C. Saeger.

New Record for Steel Production

Made Last Year, But Bessemer Tonnage Declines—Slight Decrease in Production of Plates and Sheets

A new record for the production of steel was made by the United States last year, as shown by the bulletin just issued by the Bureau of Statistics of the American Iron and Steel Institute.

The production of all kinds of steel ingots and castings in 1913 amounted to 31,300,874 tons, against 31,251,303 tons in 1912. While the production in 1913 was the largest in the country's history, it was only 49,571 tons greater than the output in 1912. Of the total production in 1913, 30,280,130 tons were ingots and 1,020,744 tons were castings, against 30,284,682 tons of ingots and 966,621 tons of castings in 1912.

The accompanying table gives by states the production of all kinds of steel ingots and castings by processes in 1913.

In 1913 there were 304 works in 30 states, the District of Columbia and the Canal Zone, Panama, which made steel ingots or castings, as compared with 306 works in 31 states, the District of Columbia and the Canal Zone, Panama, in 1912.

Included in the total for 1913 are about 714,357 tons of ingots and castings which were treated with ferro-vanadium, ferro-titanium, ferro-chrome, nickel, or other alloys, of which about 625,430 tons were ingots and about 88,927 tons were castings, as compared with about 792,501 tons in 1912, of which about 689,392 tons were ingots and about 103,109 tons were castings. Of the total in 1913 about 74,924 tons were Bessemer steel ingots or castings, about 599,890 tons were open-hearth, about 28,279 tons were crucible, about 11,254 tons were electric, and about 10 tons were miscellaneous.

Open Hearth Steel

The total production of open-hearth steel ingots and direct castings in 1913 amounted to 21,599,931 tons, against 20,780,723 tons in 1912, an increase of 819,208 tons, or over 3.9 per cent. In 1908 the production of open-hearth steel for the first time exceeded the production of Bessemer steel, the excess amounting to 1,719,974 tons, or over 28.1 per cent. In 1913 the output of open-hearth steel exceeded the output of Bessemer steel by 12,054,225 tons, or over 126.2 per cent. Of the total production of open-hearth steel in 1913, 20,689,715 tons were ingots and 910,216 tons were castings, against 19,909,875 tons of ingots and 870,848 tons of castings in 1912.

At the close of 1913 there were 183 completed open-hearth steel plants, of which 158 were active during the year and 25 were idle. Of the total, 119 were equipped to make basic steel, of which 105 were active during the year and 14 were idle; and 93 were equipped to make acid steel, of which 76 were active and 17 were idle. Some of the plants were equipped to make both basic and acid steel. Seven plants were being built on Dec. 31, 1913.

At the close of 1912 there were 182 completed open-hearth steel plants, of which 157 were active during the year and 25 were idle.

Duplex Steel Ingots and Castings

Included in the 20,344,626 tons of basic open-hearth steel ingots and castings produced in 1913 are 2,210,718 tons of duplex steel ingots and castings which were made from metal partly purified in Bessemer converters and finally purified in basic open-hearth steel furnaces, against 1,438,654 tons in 1912, an increase of 772,064 tons, or over 53.6 per cent.

Bessemer Steel

The production of Bessemer steel ingots and castings in 1913 amounted to 9,545,706 tons, against 10,327,901 tons in 1912, a decrease of 782,195 tons, or over 7.5 per cent. The maximum production was reached in 1906, when the output amounted to 12,275,830 tons. The year of next largest output was 1907.

Electric Steel

The production of steel by the electric process in 1913 amounted to 30,180 tons as compared with 18,309 tons in 1912, an increase of 11,871 tons, or over 64.8 per cent.

On Dec. 31, 1913, the number of completed plants which were equipped for the manufacture of steel by the electric process was 19, as compared with 14 plants at the close of 1912, a gain of five plants. In addition three plants were being built on Dec. 31, 1913—one in New York, one in Pennsylvania, and one in Oregon—and seven plants were projected—one in New York, one in New Jersey, two in Pennsylvania, one in Tennessee, one in Ohio, and one in Michigan.

Plates and Sheets

The production of iron and steel plates and sheets in 1913, excluding nail plate and skelp, but including black plates, or sheets, for tinning, amounted to 5,751,037 tons, against 5,875,080 tons in 1912, a decrease of 124,043 tons, or over 2.1 per cent. The maximum production was reached in 1912. The year of next largest production was 1913.

To the total output of plates and sheets in 1913 universal plates contributed about 20.1 per cent; sheared plates, rolled on single stands of rolls, about 24.3 per cent; sheared plates, roughed and finished on separate stands of rolls, about 7.8 per cent; black sheets, made on either sheet or jobbing mills, about 29.9 per cent; and black plates, including black plates for tinning, and all other black plate specialties rolled on tin mills, about 17.9 per cent.

The production of black plates, or sheets, for tinning in 1913 amounted to 827,266 gross tons, against 982,197 tons in 1912, a decrease of 154,931 tons, or over 15.7 per cent.

Tinplates and Terne Plates

The production of tinplates and terne plates in 1913 amounted to about 1,845,130,000 pounds, or 823,719 gross tons, against about 2,157,055,000 pounds, or 962,971 tons, in 1912, a decrease of 311,925,000 pounds, or 139,252 tons. As compared with 1912 the production in 1913 shows a decrease of over 14.4 per cent.

Combined

Are Wheeling Steel & Iron and Wheeling Sheet & Tin Plate Companies

At separate meetings held at Wheeling, W. Va., July 17, the stockholders of the Wheeling Steel & Iron Co., Wheeling, W. Va., and those of the Wheeling Sheet & Tin Plate Co., which operates a 10-mill tin plate plant at Yorkville, O., voted in favor of the consolidation of the two interests. An accurate outline of the proposed consolidation was given on page 112 of the July 16 issue of THE IRON TRADE REVIEW.

Stockholders of the Wheeling Steel & Iron Co. voted to increase capital stock from $5,000,000 to $7,500,000, to enable them to purchase the stock of Wheeling Sheet & Tin Plate Co., which is located on the Ohio side of the river, not far distant from Wheeling. The increase in capital will also permit the purchase of rather extensive equipment for installation in the plants of the Wheeling Steel & Iron Co.

The consolidation will give the

Wheeling Steel & Iron Co. an outlet for its surplus steel, and will take the Wheeling Sheet & Tin Plate Co. out of the market as a purchaser of raw material. The new plant of the latter company was described in full in the Jan. 2, 1914, issue of THE IRON TRADE REVIEW.

Although 31,153 of the 34,614 shares of the Wheeling Steel & Iron Co. represented at the meeting voted in favor of the merger, the plan encountered some opposition. Judge J. C. Nichols, a stockholder, expressed himself as believing the amount asked for the Wheeling Sheet & Tin Plate Co. was too high, and suggested that further investigation of properties be made. Several others appeared to oppose the plan. When it came to a vote, however, it was apparent that the majority was keenly in favor of the plan.

Resolutions providing for the increase in capital also recommended that the board of directors be increased from nine to thirteen members. The four new members elected were: Isaac M. Scott, president of the Wheeling Sheet & Tin Plate Co. and former president of LaBelle Iron Works, Steubenville, O.; J. J. Holloway, B. W. Peterson and F. W. Henderson.

It is understood Isaac M. Scott will become president of the consolidated interests and C. R. Hubbard, president of the Wheeling Steel & Iron Co. will be elected chairman of the board. It was voted to increase the salary of president of the Steel & Iron company from $10,000 to $15,000 a year.

Mr. Hubbard, speaking in favor of the merger, said that the capacity of the Steel & Iron company's plant represented about 200,000 of pig iron a year, of which the company was able to utilize only about 50 per cent. After taking over the Sheet & Tin Plate company, there will be a surplus of about $1,300,000, which will be used in making improvements to the Benwood plant of the Steel & Iron company.

Pittsburgh Strike is Ended

The building trades strike in the Pittsburgh district, which waged for about two weeks, involving 3,000 men, was settled last Friday, and the men returned to work Monday. The men struck for an increase in wages. The exact character of the settlement is unknown. Work was suspended on numerous structural undertakings throughout the city, including the new Bell Telephone building, an addition to the Carnegie Institute of Technology, the Model Engine Co.'s plant, the Tuberculosis hospital and three public school buildings.

OPEN HEARTH STEEL CASTINGS

Years.	Basic.	Acid.	Total.	Years.	Basic.	Acid.	Total.
1898...	28,460	92,127	120,587	1906...	313,548	406,343	719,891
1899...	39,689	130,040	169,729	1907...	366,476	380,049	746,525
1900...	42,644	134,847	177,491	1908...	155,005	156,772	311,777
1901...	94,941	206,681	301,622	1909...	306,005	295,035	601,040
1902...	112,404	255,475	367,879	1910...	433,976	429,375	863,351
1903...	134,879	265,469	400,348	1911...	266,626	304,565	571,191
1904...	98,919	203,915	302,834	1912...	443,998	426,850	870,848
1905...	206,159	320,381	526,540	1913...	460,161	450,055	910,216

ELECTRIC STEEL

Years—Electric steel—Gross tons.	Ingots.	Castings.	Total.
1909	13,456	306	13,762
1910	50,821	1,320	52,141
1911	27,227	1,878	29,105
1912	14,147	4,162	18,309
1913	20,973	9,207	30,180

PLATES AND SHEETS

States—Gross tons.	1909.	1910.	1911.	1912.	1913.
New Eng., N. Y., & N. J..	119,642	141,999	106,298	108,477	103,671
Pennsylvania	2,384,185	2,808,883	2,405,247	3,166,872	3,115,796
Delaware and Maryland..	29,038	23,863	22,060	19,488	14,413
West Virginia	211,012	225,649	246,893	317,718	298,789
Kentucky and Alabama	70,639	69,610	67,930	65,598	82,385
Ohio	938,185	1,052,414	1,168,879	1,493,825	1,327,913
Ind., Ill., Wis., Mo., Wyoming, and California...	481,645	633,066	470,742	703,102	808,070
Total	4,234,346	4,955,484	4,488,049	5,875,080	5,751,037

TINPLATES AND TERNE PLATES

States—Tinplates and terne plates.	1912—Pounds.	1913—Pounds.	Decrease.
Pennsylvania	1,261,340,000	1,070,812,000	190,528,000
Maryland and West Virginia	433,574,000	383,767,000	49,807,000
Ohio, Indiana, Ill., and Michigan	462,141,000	390,551,000	71,590,000
Total	2,157,055,000	1,845,130,000	311,925,000

ALL KINDS OF STEEL

States—All kinds of steel ingots and castings—Gross tons.	Bessemer.	Open-hearth.	Crucible and all other.	Total ingots and castings.
Mass., Rhode Island, and Conn.	2,476	195,419	2,716	200,611
New York and New Jersey	371,372	996,312	39,032	1,406,716
Pennsylvania	2,954,818	12,522,227	77,249	15,554,294
Del., Md., Dist. of Col., Va., W. Va., Ky., Ga., Ala., Tenn., La., Tex...	637,063	1,183,977	1,285	1,822,325
Ohio	4,024,662	2,726,219	4,170	6,755,051
Indiana and Illinois	1,475,424	3,444,960	20,600	4,940,984
Mich., Wis., Minn., Mo., Iowa, Utah, Kan., Col., Ore., Wash., Cal., and Canal Zone, Panama	79,891	530,817	10,185	620,893
Total for 1913	9,545,706	21,599,931	155,237	31,300,874
Total for 1912	10,327,901	20,780,723	142,679	31,251,303

TIPS FOR NEW BUSINESS

Equipment needs of the Iron and Steel works, Machine shops, Foundries and other Metal Working plants

In New York, from the point of view of business actually booked, the machinery market, during the week just closed, did not reflect any marked change from the preceding week. The volume of inquiry, however, showed a decided improvement, particularly in railroad business, and the feeling is a good deal better. The leading event of the week was the issuance, by the Seaboard Air Line, of a list of revised specifications, to replace the list which was put out nearly a year ago, and which was never closed. The new list includes some 50 tools, involving a total value of about $200,000, and the request accompanying the list was that the bids submitted should be final and that no reduction would be permitted after the figures once are in; from this it is believed the business will be distributed without delay. The tools on the list are for installation at the Portsmouth, Va., shops. The Baltimore & Ohio railroad is in the market for seven tools and a furnace, and the Union Pacific has issued a list of six tools which, it is believed, are to be installed at Pocatello, Id. Two eastern railroads quietly have purchased machinery during the week, the requirements of one being especially large. The Lehigh Valley also has placed orders for a number of tools for Sayre, Pa., the inquiry for which has been before the trade for a long time. Better buying of cranes is reported, but competition is keen and prices are very low. Demand for second-hand machinery is good, but demand from abroad is of small proportions.

In Chicago, dealers in machinery and tools find the summer offers no improvement on previous conditions. Scattered orders continue to come and second-hand machines have been moved fairly well. There is absence of machine lists and no particular line of industry seems to be prospering sufficiently to need added equipment.

In Pittsburgh, machine tool builders have experienced no change in the trade, although the market has reflected a better tone the last two or three weeks, due, perhaps, to improved sentiment in other lines. According to some expressions, inquiries have fallen off somewhat since the middle of the month, but it is too early to compare the last half of July with the first. Builders of heavy rolling mill equipment continue to operate at practically full capacity, principally on old orders, although some new contracts have been taken recently, as noted elsewhere in THE IRON TRADE REVIEW.

In Cincinnati, machine tool manufacturers report that business done during the first half of July showed a decrease in comparison with that of either the first or last half of June. A number of shops have been running spasmodically as they have not enough orders on their books to operate steadily. Several machine shops that closed down last month, presumedly for alterations and repairs, haye not resumed operations and will remain closed indefinitely. Orders are mostly for single tools as actually needed, and those users needing large lots show no indication of buying at the present time. Second-hand machinery is slow and unsatisfactory. Special machinery has dropped off considerably since the first of June, but makers of laundry and baking machinery are busy on old orders. Refrigerating equipment is fair. Small electrical equipment is selling in light lots only, but has remained steady since about May 1.

At Louisville, Ky., machinery and tool men, though by no means rushed, are enjoying a moderate amount of business and, since the long drouth has ended in soaking rains, are confidently looking ahead to a good season. Business generally was becoming apprehensive as to the effect the drouth would have on collections and on trade for the fall, but now that a corn crop of substantial proportions, a good tobacco crop and other late crops are as nearly assured as they can be, business in that section has taken heart and the iron trade is looking up with it. Demand continues to come generally in Louisville from the buildings that are going up, while out in the state, especially in the eastern part, where mining operations, railroad extensions and saw mills are multiplying rapidly, requirements are by no means inconsiderable.

EASTERN STATES

TORRINGTON, CONN. — The American Brass Co. has the ground prepared for the foundation of its proposed large foundry to be built here.

ERIE, PA.—Erie Malleable Iron Works, Watson Paper Co. and the American Sterilizer Co. are completing additional buildings started in the spring, representing a $500,000 investment.

HARRISBURG, PA. — Hickok Mfg. Co. will erect a foundry and machine shop building for manufacturing book binding machinery.

PITTSBURGH.—The Model Engine Co. has purchased a 4-acre tract on Lexington avenue extending to the Pennsylvania railroad right-of-way and will erect a $250,000 machine works at once.

READING, PA.—D. K. Hoch, county controller, will open bids July 23 for a reinforced concrete girder bridge over Spring Creek between North Heidelberg and Heidelberg station; bids must be accompanied by a certified check for 10 per cent.

FARMINGDALE, N. J.—Fred G. Dokkeneadel, of New York, will erect a factory here for manufacturing machines with which farmers may mix their own fertilizer; he also is the inventor of the odorless fertilizer manufactured here.

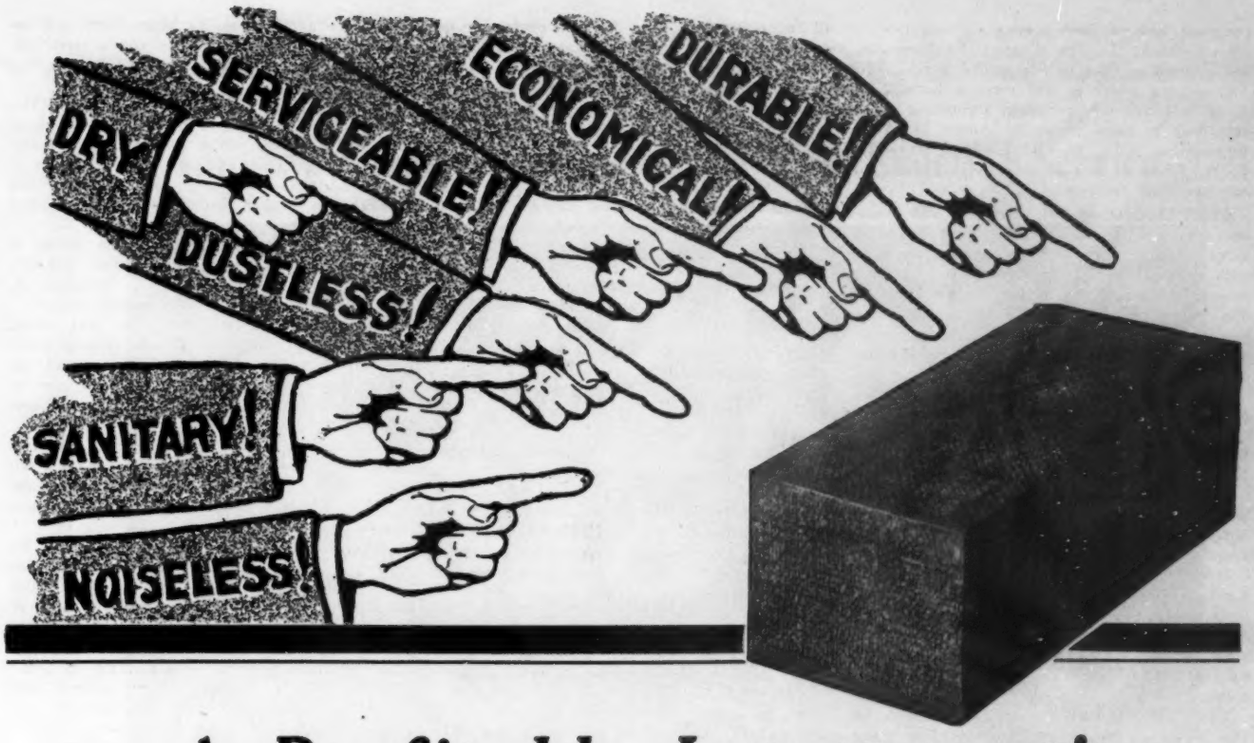
MT. HOLLY, N. J.—County freeholders will receive bids until 11:30 a. m., July 31 for a reinforced concrete pipe bridge with bascule span over Bass river; James Logan, county engineer.

PLAINFIELD, N. J.—The Spicer Mfg. Co., manufacturer of universal joints, now is erecting a large addition to its plant in South Plainfield for the purpose of concentrating all its work there. The plant in Plainfield proper is to be abandoned.

WASHINGTON. — Secretary Daniels will advertise, Aug. 1 for two battleships to be built at the Brooklyn navy yard.

CENTRAL STATES

CALDWELL, O. — M. C. Johns, Noble county auditor, will open bids Aug. 8 for one 96-foot span steel bridge superstructure over



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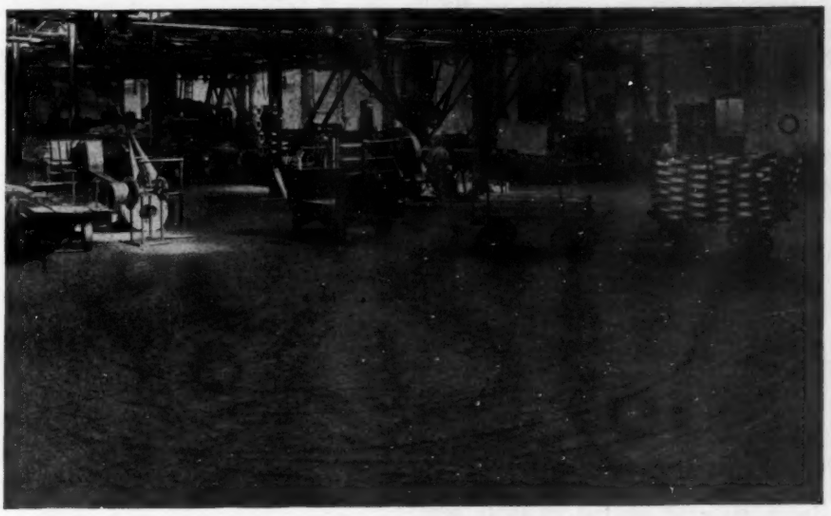

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CLEVELAND, O.—801 Swetland Bldg. ST. LOUIS, MO.—554 Pierce Bldg.
KANSAS CITY, MO.—1117 Rialto Bldg. MEMPHIS, TENN.—1402 Exchange Bldg.
PHILADELPHIA, PA.—319 Perry Bldg.

the west fork of Duck creek.

CLEVELAND.—The Enamel Products Co. has secured a 4½-acre site at Eddy road and Taft avenue where it will erect a 1-story, 80 x 280-foot vitreous porcelain enameling plant according to plans drawn by Albert M. Allen Engineering Co.; W. B. Hickox, president, C. W. Blossom, vice president; J. Foster Jr., secretary and treasurer.

CLEVELAND.—J. B. Perkins and associates have a factory building project to involve about $2,500,000. A 1-story building with sawtooth roof will cover a 16-acre site; around the four sides it will be two stories. The entire plant will be divided into many smaller ones with individual switching facilities; thus it will be fitted to accommodate small manufacturing plants.

DELAWARE, O.—The Delaware Foundry & Machine Co., general foundry, has been incorporated; $25,000; by Robert Greer, C. C. Stedman, H. M. Bing, F. W. Bauereis and R. E. Hill.

GALION, O.—H. A. Biebighauser, auditor of commissioners, Crawford county, will open bids Aug. 7 for a riveted steel truss bridge superstructure over the Sandusky river.

HAMILTON, O.—W. W. Crawford, county auditor, will receive bids until Aug. 1 for a steel bridge over Miami river near Woodsdale. Bids are asked on both concrete and steel construction, all such to be accompanied by the bidder's plans. Address F. M. Hammerle, county surveyor.

IRONTON, O.—Work will start soon on the Ironton, Portsmouth traction line; first section will be built to Wheelersburg; Raymond D. York, Portsmouth, vice president.

JEFFERSON, O.—The council has granted a 25-year franchise to the Chardon, Jefferson, Meadeville Interurban railway; construction to begin not later than the middle of August.

MARIETTA, O.—County auditor is asking bids for 10 concrete and 3 steel bridges; will open bids Aug. 7.

MT. GILEAD, O.—C. O. Higgins, county auditor, will receive bids until Aug. 7 for the following bridges: Chesterville bridge, 108 feet long, 16-foot roadway; Noble bridge, 60 feet long, 16 feet wide.

NEW PHILADELPHIA, O. — The Union Lumber Co. has the contract for building the 192 x 211-foot addition to the Belmont Stamping & Enameling Co.

SALEM, O.—The H. J. Harrold Tool Co., manufacturer of all kinds of tools, automobile springs a specialty, will enlarge its plant and build an office.

SALEM, O.—More than 75 iron and steel bridges must be built in Unity, Fairfield and Salem townships along the route of the Cox Main Market road No. 14; estimated cost, $20,000; same to be built with 10-inch iron pipe when possible; plans in the making at the city engineer's office.

TOLEDO, O.—The Toledo Steel Tube Co., recently incorporated with $100,000 capital stock, is seeking a site; H. W. McKisson, of the Ohio Die & Tool Co., is interested.

YOUNGSTOWN, O. — The Pittsburgh, Harmony & Butler line will be extended from Butler to this place. The Mahoning avenue line will be extended to West Austintown.

LOUISVILLE, KY.—The Electric Garage Co. has been organized and will equip a building which is now under construction with motors and other machinery.

LOUISVILLE, KY.—The Kentucky Paper Box Co. is in the market for 12 motors for installation in a new factory building which it recently leased. The maximum horsepower of the motors is twelve.

LOUISVILLE, KY.—The Twin Mfg. Co. has been incorporated to manufacture washing machines; $50,000; by H. J. Graham, B. H. Wilson, Virgil Popham and Lucas Moore; limit of indebtedness is $10,000.

LOUISVILLE, KY.—The Louisville board of education is now letting contracts for school buildings and equipment therefore as the result of an issue of bonds to the amount of $1,000,000 for school building purposes. The principal building to be erected, that for the boy's high school, is already under contract, involving an expenditure of about $275,000, but a number of ward schools costing about $100,000 each, will also be built. The schools are taking a large amount of structural material, besides boilers for heating plants, ventilating equipment, etc. Machinery men have been watching the lettings in this connection closely. J. Earl Henry is architect and Sam D. Jones business director of the board.

MIDDLESBORO, KY. — The Middlesboro Electrical Works will buy machine tools and other equipment for a shop which will be devoted to the repair of electrical power machinery.

OWENSBORO, KY. — Extensive manufacturing operations are contemplated by the Owensboro Ditcher & Grader Co., which recently filed articles of incorporation with $250,000 capital stock. C. A. Rogers and others are interested. The machines to be marketed by the company are being made under contract at present, but a factory will be erected in the near future.

BOONVILLE, IND.—All bids for the 15 steel bridges in Warrick county have been rejected and commissioners will readvertise.

BOONVILLE, IND. — N. M. Spradley, Warwick county auditor, will open bids Aug. 4 for 15 bridges; plans on file at his office, usual bond required.

HAMMOND, IND.—The Armor Steel Co. has purchased the plant of the Riverdale Iron & Steel Co. which has been shut down for several years. If sufficient financial support is given, the company will enlarge the plant and start it operating shortly.

BLOOMINGTON, ILL. — The B. & N. Railway & Light Co. will make improvements costing between $20,000 and $25,000.

BLOOMINGTON, ILL.—The Bloomington Canning Co. has purchased a 6-acre site for its proposed factory.

CHICAGO.—The Duffin Iron Co. has been incorporated to deal in iron, steel and metal products; $25,000; by A. Westergreen; Harry Weig, 1739 Newpoer avenue; Albert L. Quist, 1540 Winona avenue.

CHICAGO.—William J. Casey Co. has been incorporated to manufacture screw machine products and conduct a machine shop; $10,000; by Charles A. Ruth; L. W. Thompson; Alfred W. Bays, 2085 Estes avenue

CHICAGO.—M. F. Strauch, 1356 Diversey Parkway, has plans in progress for a theater, store and office building, 50 x 125 feet, four stories, brick, steel and reinforced concrete, to cost $50,000.

CHICAGO.—The Pullman Co., Frank O. Lowden, chairman building directors, Arcade building, is to erect a manual training school containing a shop building 50 x 100 feet, and an engine and power house.

DeKALB, ILL.—The plant of the Jacob Haish Co., recently destroyed by fire, will not be rebuilt. The gas engine works will be continued at DeKalb as heretofore, but the agricultural implement business will be taken over by the Rock Island Plow Co., Rock Island, Ill., which has been the selling agent for the Haish Co. for some time.

URBANA, ILL.—Freeman & Brooks, of Champaign, have the contract for the $45,000 power plant to be built at the University; equipment includes two 500-horsepower Babcock Wilcox water tube boilers fitted with Green stokers.

WAUKEGAN, ILL.—The Leggett & Platt Bedspring Mfg. Co., of Carthage, Mo., will move its business here and locate in half of the old Cyclone Fence Co. building.

MUSKEGON, MICH. — The Michigan Washing Machine Co. will erect a 1-story 25 x 65-foot addition to its plant here and install a 200-horsepower engine and a steel casing boiler; work to be completed by the last of August.

SAULT STE. MARIE, MICH. — The Seeyle Combination Axe & Tool Co. is about to erect a 2-story, 60 x 70-foot factory building; estimated cost, $15,000.

BRILLION, WIS. — The Brillion Iron Works has broken ground for a new office building of steel and concrete.

KENOSHA, WIS.—The Kenosha Boiler & Structural Co. has been incorporated; $10,000; by Frank G. Erickson, W. G. Bloxdorf, A. H. Klueudor and Geo. W. Taylor, city.

WEST BEND, WIS. — The West Bend Aluminum Co. now has its new factory building in shape for roof construction and expects to be able to make it ready for the installation of machinery and equipment about Aug. 5.

ST. LOUIS.—The Union Electric Light & Power Co. has taken a 99-year lease on a site at Forest Park boulevard and Vandeventer avenue, where it will erect a plant or warehouse.

ST. LOUIS.—Simplex Shoe Machinery Co. has been incorporated to do a general shoe machinery business; $150,000; by W. G. Battle, C. E. Clark, T. W. Fuqua, Fred W. Peters and Eugene S. Wilson.

DULUTH.—J. F. Frodin, Exchange building, has the general contract for an office building, 30 x 50 feet, three stories, brick steel and concrete, to cost $70,000.

SOUTHERN STATES

COLUMBUS, GA.—The Meritas Mills will build a 120 x 150-foot addition to its weaving department to cost about $15,000.

OCALA, FLA.—The Ocala Iron Works, makers of gray iron, brass and bronze, will rebuild its machine and pattern shops badly damaged by fire about a month ago.

NAPLES, TEX.—The Northeastern Electric Co. has been incorporated; $15,000; by J. C. Martin, M. Galloway and J. P. Bendell.

WESTERN STATES

SIOUX FALLS, S. D.—Sioux Falls Construction Co. has the general contract for a structure 66 x 150 feet, two stories, brick and reinforced concrete, to cost $50,000.

WICHITA, KAS.—The Kansas City, Mexico & Orient railroad has been sold to bondholders for $6,100,000; the line will be extended from this place to Kansas City; receivers have raised $15,000,000 abroad for financing an extension across the border into Mexico.

PUEBLO, COL.—Pasquale Russo who has invented a machine for harvesting and preparing beets for marketing, is president of a company being organized to manufacture and market the device; capital stock, $200,000; at present the Pueblo foundry is making the machine but the company hopes in about six months to build its own plant.

SAN FRANCISCO. — Pacific Steel Fence Co. has been incorporated; steel fences; $100,000; by A. C. Kane, J. C. Tucker, F. S. Carter, D. S. Beekman and Geo. B. Keene, Hearst building, city.

TRADE NOTES

DAYTON, O.—The Apple Electric Co. has consolidated with the Splittdorf Co., Newark, N. J., and will move its business there. The consolidated company will have a new plant there occupying two large buildings equipped with the most improved machinery.

MOLINE, ILL.—The Deere & Mansur Co., maker of agricultural implements, resumed operations July 13. Other concerns in the same line at Moline will reopen about Aug. 1.

Kreolite Floors

Improve Under the Hardest and Most Exacting Service

Kreolite Block Floor in the plant of The Lunkenheimer Co., Cincinnati, O., Valve Makers

ANY experienced factory engineer or mill superintendent will need but to glance at this shop view to realize the extraordinary wear which this Kreolite Block Floor must withstand daily.

IN THE LUNKENHEIMER PLANT the heavy iron and brass castings that are handled and trucked over their floors would soon wear out any ordinary form of floor construction. That Kreolite Wood Block Floors are giving satisfaction is evidenced by the many return orders they have given us.

THE REASON why Kreolite Wood Block Floors give such satisfaction is because of the careful selection of the wood used, the thoroughness with which the blocks are manufactured and treated, the unequalled quality of the Kreolite Oil, and the use of improved methods of installation.

KREOLITE WOOD BLOCK FLOORS excell in durability, and for this reason have been laid in many of the largest iron working plants in the country. Subject one of our floors to extremely heavy service and then compare results with other types of flooring.

SHOP EFFICIENCY is the watchword in the up-to-date plant these days. Secure its advantages by installing Kreolite Wood Block Floors. Workmen say they are easy on the feet, and that they make them feel like doing their best work. These floors are also smooth, compact and easy to truck over.

Are you planning to relay an old floor or put down a new one? Our service department has helped others solve the factory floor problem. We believe we could help you. Specifications and estimates on request.

THE JENNISON-WRIGHT COMPANY

309 HURON STREET TOLEDO, OHIO

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery Through Third Quarter.)

Bessemer, valley	$14.00
Bessemer, Pittsburgh	14.90
Basic, Pittsburgh	13.90
Basic, eastern Pa.	14.00 to 14.50
Malleable, Pittsburgh	13.90 to 14.40
Malleable, Chicago	14.00
Malleable, Philadelphia	15.50 to 15.75
Malleable, Buffalo	12.75 to 13.00
No. 1X Philadelphia	15.00 to 15.25
No. 2 foundry, Pittsburgh	13.90 to 14.40
No. 2 foundry, Cleveland	13.75 to 14.25
No. 2 foundry, Ironton	13.00 to 13.50
No. 2 foundry, Chicago	14.00
No. 2X foundry, Philadelphia	14.75 to 15.00
No. 2X foundry, New York	14.25 to 14.75
No. 2X foundry, Buffalo	12.75 to 13.00
No. 2 plain, Philadelphia	14.50 to 14.75
No. 2 plain, New York	14.00 to 14.25
No. 2 plain, Buffalo	12.50 to 12.75
No. 2 southern, Birmingham	10.00 to 10.50
No. 2 southern, Cincinnati	13.25 to 13.75
No. 2 southern, Chicago	14.85 to 15.85
No. 2 southern, Philadelphia	15.00 to 15.25
No. 2 southern, Cleveland	14.60 to 14.85
No. 2 southern, New York	14.75 to 15.00
No. 2 southern, St. Louis	14.50 to 15.00
Virginia, 2X, Philadelphia	15.50 to 15.75
Virginia, 2X, Jersey City	15.30 to 15.75
Virginia, 2X, New Eng., all rail	16.00 to 16.50
Gray forge (eastern Pa.)	13.75
Gray forge, Pittsburgh	13.65
Gray forge, Birmingham	9.00 to 9.50
Silveries, 8 per cent, Cleveland	17.55
Silveries, 5 per cent, Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phila.	20.50
Lebanon low phos., furnace	17.00 to 17.50
Low phos., Pittsburgh	21.65 to 21.90
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	15.75 to 16.75
Charcoal, Birmingham	25.00
Middlesbrough, No. 3, Phila., ex-ship	15.00 to 15.25

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.50
Old range, non-Bess., 51½ per cent	3.00
Mesabi, non-Bessemer, 51½ per cent	2.85

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent	7 to 8c
Foreign non-Bess., 50 to 65 per cent.	7 to 8c

COKE

(At the ovens.)

Connellsville furnace	$1.75 to 1.85
Connellsville fur. contr.	1.85 to 2.00
Connellsville foundry	2.25 to 2.50
Connellsville fdy., contr.	2.40 to 2.65
Wise county furnace	1.90 to 2.10
Wise county foundry	2.25 to 2.75
Pocahontas furnace	1.90 to 2.05
Pocahontas foundry	2.25 to 2.40
New River, foundry	2.75 to 3.50
New River, furnace	2.20 to 2.35

FERRO-ALLOYS

Ferro-manganese, Baltimore	$37.00 to 38.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Bess. billets, Pbgh. and Yn.	$19.00 to 19.50
Open-hearth bil., Pbgh. and Yn.	19.00 to 19.50
Open-hearth bil., Phila.	21.90 to 22.40
Bess. sheet bars, Pbgh. and Yn.	20.00 to 20.50
Op.-h'th sh. bars, Pbgh. and Yn.	20.00 to 20.50
Forging billets, Phila.	25.90 to 26.90
Forging billets, Pittsburgh	24.00 to 25.00
Wire rods, Pittsburgh	24.50 to 25.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Light rails, 8 lbs., Pbgh. or Chi.	1.40c
Lgt. rails, 12 lbs., Pbgh. or Chgo.	1.35c
Lgt. rails, 16 to 20 lb., Pbgh. or Chicago	1.30c
Lgt. rails, 25 to 45 lbs., Pbgh. or Chicago	1.25c
Relaying rails, standard, Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect. Pbgh., base	1.50c
Angle bars, st. sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.40c to 1.45c
Spikes, railroad, Chgo.	1.55c
Track bolts, Pbgh.	2.00c
Track bolts, Chgo.	2.00c

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.10c to 1.15c
Structural shapes, Chicago	1.28c to 1.33c
Structural shapes, Philadelphia	1.25c to 1.30c
Structural shapes, New York	1.26c to 1.31c
Structural shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.28c to 1.33c
Tank plates, Pittsburgh	1.10c to 1.15c
Tank Plates, Philadelphia	1.25c to 1.30c
Tank plates, New York	1.26c to 1.31c
Bars, soft steel, Pittsburgh	1.10c to 1.15c
Bars, soft steel, Chicago	1.28c to 1.33c
Bars, soft steel, Philadelphia	1.30c
Bars, soft steel, New York	1.31c
Hoops, carloads, Pittsburgh	1.25c

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Baltimore	14½ cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Minneapolis and St. Paul	32 cents
Denver	67½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, plates and shapes	80 cents

Hoops, less carloads, Pittsburgh	1.30c
Bands, Pittsburgh	1.10c to 1.15c
Shafting, carloads, Pbgh., disc. contract	66 to 67 off
Shaft'g less carl'ds, Pbgh., disc.	63
Bar iron, Chicago	1.05c to 1.10c
Bar iron, Philadelphia	1.15c to 1.20c
Bar iron, New York	1.25c to 1.30c
Bar iron, Cleveland	1.20c
Bar iron, Pittsburgh	1.20c to 1.25c
Hard steel bars, Chicago	1.25c to 1.30c
Smooth finish'g mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.80c to 1.85c
No. 28, black, Chicago	1.98c to 2.03c
No. 28, tin mill, black, Pbgh.	1.80c to 1.85c
No. 28, galvanized, Pbgh.	2.75c to 2.85c
No. 28, galvanized, Chgo.	2.93c to 2.98c
No. 10, blue, annealed Pbgh.	1.35c
No. 10, blue, annealed Phila.	1.50c
Tin plate, 100 lb., coke, base	$3.25 to 3.30

IRON AND STEEL PIPE

(Pittsburgh.)

	Black Butt-weld.	Galv.
Steel, ¾ to 3 inches	80	71½
Iron, ¾ to 2½ inches	70	61
	Lap-weld.	
Steel, 2¼ to 6 inches	79	70½

BOILER TUBES

Steel, 3½ to 4½ inches	73
Iron, 3½ to 4½ inches	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh	$1.50 to 1.55
Wire nails, retailers, Pittsburgh	1.55 to 1.60
Plain wire, jobbers, Pittsburgh	1.30 to 1.35
Plain wire, retailers, Pittsburgh	1.35 to 1.40
Galvanized wire, jobbers, Pbgh.	1.70 to 1.75
Galvanized wire, retailers, Pbgh.	1.75 to 1.80
Polished staples, Pbgh.	1.50 to 1.55
Galvanized staples, Pbgh.	1.90 to 1.95
Barb wire, painted, jobbers, Pbgh.	1.50 to 1.55
Barb wire, painted, retail'rs, Pbgh.	1.55 to 1.60
Barb wire, galv., retail's, Pbgh.	1.95 to 2.00
Barb wire, galv., jobbers, Pbgh.	1.90 to 1.95

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, 3/8 x 6 inches, smaller or shorter, rolled threads, 80 and 20; cut threads, 80 and 15; larger or longer, 75 and 15.

Machine bolts with hot pressed nuts 3/8 x 4 inches, smaller or shorter, rolled, 80 and 25; cut, 80 and 20; larger or longer, 80.

Gimlet and cone point lag or coach screws, 80 and 25.

Hot pressed square, blank or tapped nuts, $6.30 off list; hot pressed hexagon blank or tapped, $7.20 off.

Cold pressed, c. and t. square, blank or tapped, $6 off; hexagon, blank or tapped, ⅝ inch and larger, $7.20; 9/16-inch and smaller, $7.80.

RIVETS

Structural rivets, Pbgh.	1.50c to 1.60c
Structural rivets, Chgo.	1.68c
Boiler rivets, Pbgh.	1.60c to 1.70c
Boiler rivets, Chgo.	1.78c

SCREWS

(New York.)

Lag, gimlet and cone point.	80 and 20
Coach, gimlet point	80
Standard Jack	70 and 10
Mch., cut thread, flat head.	50 and 10
Mach., cut thread, round head	50 and 10 and 10
Mch., cut thread, fillister hd.	40 and40 and 10
Mch., rolled thread, flat head or round head	80 and 10
Set screws, iron	75 and 10 and 10
Set screws, steel, per cent advance over iron	25
Square head cap screws	70 and 10 and 10
Hexagon head cap screws	70 and 10 and 10
Fillister head cap screws	60 and 10 and 10
Flat head wood screws	10 and 10 and 5
Round head wood screws	10 and 10 and 5

CAR WHEELS

33-inch Engine truck wheels	$22.00 to $24.00
36-inch engine truck wheels	23.00 to 25.00
33-inch tender wheels	18.00 to 18.50
36-inch passenger train car and tender wheels	20.00 to 20.50
33-inch freight car wheels	15.50 to 16.00

All f. o. b. Pittsburgh.

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

TWISTED REINFORCING BARS

(Soft steel, Pittsburgh mill.)

¾-inch and larger	1.15c to 1.25c
⅝-inch	1.20c to 1.30c
½-inch	1.25c to 1.35c
⅜-inch	1.40c to 1.50c
¼-inch	1.65c to 1.75c

IRON AND STEEL PRICES

Corrected up to Tuesday noon

TACKS

(New York.)—

	Discount.
American carpet tacks	90 and 20 and 10 and 10
American cut tacks	90 and 20 and 10 and 10
Railroad tacks	90 and 50 and 10
Gimp tacks	90 and 20 and 10 and 10
Finishing nails	70

WIRE ROPE

Galvanized, iron and steel	47½ and 2½
Bright, Iron and steel	55 and 2½

TRIANGLE REINFORCING MESH

(Per 100 square feet f. o. b. mill, car loads.)

No. 4, plain	$1.00
No. 4, galvanized	1.12
No. 7, plain	.49
No. 7, galvanized	.55
No. 23, plain	1.69
No. 23, galvanized	1.88
No. 26, plain	1.17
No. 26, galvanized	1.30
No. 27, plain	.96
No. 27, galvanized	1.07
No. 31, plain	2.49
No. 31, galvanized	2.76
No. 35 plain	1.17
No. 35, galvanized	1.30
No. 39, plain	3.05
No. 39 galvanized	3.38
No. 43, plain	1.10
No. 43, galvanized	1.23

SPIRAL RIVETED PIPE

(Per 100 linear feet, f. o. b. factory.)

4-inch, plain	$ 19.76
4-inch, galvanized	30.74
6-inch, plain	33.05
6-inch, galvanized	49.73
8-inch, plain	43.17
8-inch galvanized	65.00
10-inch, plain	66.42
10-inch, galvanized	96.15
12-inch, plain	83.75
12-inch galvanized	118.30
14-inch, plain	99.14
14-inch, galvanized	138.85
16-inch, plain	117.53
16-inch, galvanized	166.58
20-inch, plain	183.79
20-inch, galvanized	248.39
24-inch, plain	219.92
24-inch, galvanized	293.99
30-inch, plain	324.81
30-inch, galvanized	430.64

CAST IRON PIPE

Three to 24 in., Cleveland	$ 22.35 to 22.80
Four-inch, water, Chicago	26.50
Six to 12 inches, Chicago	24.50
Larger sizes, Chicago	24.00
Six-inch, water, New York	20.50 to 21.50
Four-inch, water, Birmingham	19.50
Six-inch and larger, Birmingham	19.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.70c to 1.85c
Steel bars, Philadelphia	1.65c
Steel bars, New York	1.80c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, Cincinnati	1.65c to 1.75c
Iron bars, Philadelphia	1.60c to 1.65c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.80c to 1.90c
Shapes and plates, Philadelphia	1.65c
Shapes and plates, New York	1.85c
No. 10 blue ann. sheets, Chgo	1.85c
No. 10 blue ann. sheets, Cleve	2.15c
No. 10 blue ann. sheets, Cinci	1.95c
No. 28 black sheets, Chgo	2.45c
No. 28 black sheets, Cleveland	2.60c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 galv. sheets, Chgo	3.45c
No. 28 galv. sheets, Cleveland	3.60c
No. 28 galv. sheets, Cincinnati	3.40c to 3.55c

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo	$ 9.00 to 9.25
No. 1 railroad wrought, Cleve	9.50 to 10.00
No. 1 railroad wrought, St. L.	7.75 to 8.00
No. 1 railroad wrought, Cinci	8.00 to 8.50
No. 2 railroad wrought, Chgo	8.50 to 9.00
No. 2 railroad wrought, St. L.	7.50 to 7.75
Arch bars and transoms, Chgo	12.00 to 12.25
Arch bars and transoms, St. L.	11.00 to 11.50
Knuckles, coup. and spr'gs, Chgo.	9.00 to 9.50
Knuckles, coup. & spr'gs, St. L.	9.25 to 9.50
Shafting, Chicago	11.50 to 12.00
Shafting, St. Louis	13.00 to 13.50
Steel car axles, Chgo	12.00 to 12.25
Steel car axles, St. Louis	11.75 to 12.25
Locomotive tires, Chicago	9.25 to 9.50
Locomotive tires, St. Louis	8.75 to 9.25
Cut forge, Chicago	8.50 to 9.00
Pipes and flues, Chicago	6.50 to 7.00
Pipes and flues, Cleveland	7.75 to 8.25
Pipes and flues, St. Louis	5.75 to 6.25
No. 1 cast, Chicago	9.75 to 10.00
No. 1 cast, Cleveland	10.00 to 10.50

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

No. 1 cast, Cincinnati	$ 8.50 to 9.00
No. 1 cast, St. Louis	9.50 to 10.00
No. 1 busheling, Chicago	7.25 to 7.75
No. 1 busheling, Cleveland	8.25 to 8.50
No. 1 busheling, Cincinnati	5.75 to 6.25
No. 1 busheling, St. Louis	7.25 to 7.50
No. 2 busheling, Chicago	6.00 to 6.25
No. 1 boiler plate, cut, Chgo	6.50 to 7.00
No. 1 boiler plate, cut, Buffalo	9.00 to 9.50
No. 1 boiler plate, cut. St. L.	6.00 to 6.50
Boiler punchings, Chicago	9.00 to 9.25
Cast borings, Chicago	4.75 to 5.25
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.25 to 4.75
Cast borings, St. Louis	4.00 to 4.50
Machine shop turnings, Chgo	5.25 to 5.50
Machine shop turnings, Cleve	5.00 to 5.25
Machine shop turnings, Cinci	4.25 to 4.75
Machine shop turnings, St. L.	4.50 to 5.00
Malleable, agl., Chicago	7.75 to 8.25
Malleable, agricultural, St. Louis	7.50 to 8.00
Malleable, railroad, Chicago	8.75 to 9.00
Malleable, railroad, Cincinnati	6.50 to 7.00
Malleable, railroad, St. Louis	7.50 to 8.00
Angle bars, iron, Chgo	11.75 to 12.25
Angle bars, Iron, St. Louis	10.00 to 10.50
Angle bars, steel, Chgo	8.25 to 8.75
Angle bars, steel, St. Louis	9.25 to 9.50
Stove plate, Chicago	8.50 to 8.75
Stove plate, Cleveland	7.75 to 8.00
Stove plate, Buffalo	9.75 to 10.00
Stove plate, Cincinnati	6.50 to 7.00
Stove plate, St. Louis	8.25 to 8.75
Bundled sheet, Cincinnati	4.00 to 4.50
Wrought iron pil'g plates, Clev.	13.00

(Gross Tons.)

Heavy melting steel, Pbgh	$11.25 to 11.75
Heavy melting steel, Buffalo	10.00 to 10.50
Heavy melting steel, Chicago	9.50 to 9.75
Heavy melting steel, Cleveland	10.00 to 10.50
Heavy melting steel, Cincinnati	9.00 to 9.50
H'vy melting steel, eastern Pa.	10.50 to 11.00
Heavy melting steel, New York	8.50 to 8.75
Heavy melting steel, St. Louis	11.00 to 11.50
Bundled sheet, Buffalo	6.25 to 6.50
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No. 1 R. R. wrought, Buffalo	11.00 to 11.50
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Stove plate, eastern Pa.	8.50 to 9.00
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Reroll'g rails, 5 ft. & ov., Pbgh.	13.00 to 13.25
Reroll. rails, 5 ft. & ov., Chgo.	11.25 to 11.75
Reroll. rails, 5 ft. & ov., Cleve.	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa.	12.00 to 12.50
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Steel rails, short, Cleveland	12.50 to 13.00
Steel rails, short, St. Louis	10.50 to 10.75
Iron rails, Cleveland nom.	13.25 to 13.75
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, eastern Pa.	15.00 to 16.00
Iron rails, St. Louis	11.00 to 11.25
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Car wheels, (steel), Pittsburgh	12.00 to 12.25
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Car wheels, eastern Pa.	11.00 to 11.50
Car wheels, Buffalo	12.00 to 12.50
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Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa.	20.00 to 21.00
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Iron axles, Chicago	18.00 to 18.75
Steel car axles, New York	12.00 to 12.50
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Steel car axles, Cleveland	14.00 to 16.00
Steel car axles, eastern Pa.	13.75 to 14.00
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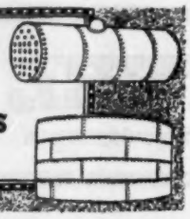

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PUBLISHED APRIL, 1914
STEEL FOUNDRY
By JOHN HOWE HALL
Consulting Engineer
271 pages, 6 x 9. Illustrated. $3.00, postpaid

THE author covers fully the *metallurgy and production of all classes of ordinary steel castings* in use in this country.

He aims to give:

(1) The characteristics of steel castings from a manufacturing point of view.

(2) The details of the various steel manufacturing processes and their characteristics as applied to the different types of castings, including relative cost of installation, relative cost and quality of steel produced, etc.

(3) Foundry procedure, such as moulding, pouring, annealing, etc.

The book will appeal alike to the metallurgist and the superintendent in charge of the foundry. It covers metallurgical processes, shop methods and costs of steel.

THE PENTON PUBLISHING CO.
PENTON BUILDING, CLEVELAND, OHIO

Testing Drills, Taps and Dies

(*Continued from page* 160)

circulated, thus also affording a means of testing various kinds of such compounds.

In this machine every point has been considered so far as possible, so that any test can be made in which the cutting effort is concentric with the center of rotation cutting from a center. In addition to testing the cutting property of tools, it can also be used for determining the cutting property of steel and metals, the holding power of drill chucks, etc., and even for small autographic torsion tests.

Fluorine Process of Making Steel

(*Continued from page* 167)

do not contaminate it on cooling. What happens to the metal which was initially combined with the fluorine, will be explained below.

The fluorine process originally was developed for use in the Bessemer converter, in which so far it appears to have given the best results. The salt which appears to be best adapted to this use is manganese sesquifluoride, either hydrate or anhydrous. In the case of the bottom blow converter, the way which appears to be most convenient, is to place the salt in a pipe joined to the blast pipe, and to force it into the blast by compressed air at a pressure slightly above the blast pressure. Coming in with the blast, the salt has no time to eat out the furnace lining near the tuyeres, and, in traveling through the bath, has enough time to decompose and do its work. In the Tropenas converter the salt might be thrown into the mouth of the converter in iron pipes plugged with fire clay. Iron cans had better be avoided.

In the open-hearth furnace the salt may be introduced, at the end of a rod, in heavy iron cans, into the metal below the slag. At just what time it is best to introduce the salt, is not yet definitely determined. The salt used may be manganese susquifluoride, of the much cheaper fluorides of iron (FeF_3 or Fe_2F_6).

Cost of the Process

The cost of the process depends entirely on the cost of the salts. When the experiments which led to the development of the present process were started, such things as manganese sesquifluoride or anhydrous iron fluoride could not be bought on the market, and even attempts to have them made to order at first proved unsuccessful, so that the author had to make nearly all of the salts which he used for his experimentation. He finally succeeded, however, in persuading a German concern to do some experimental work and to produce at least the most important of the salts on a large scale.

It is expected that the price of manganese sesquifluoride will eventually come down to 7 cents per pound, while the price of iron susquifluoride will probably hold around 3 cents. Since to eliminate a pound of impurities, approximately a pound of salts is required, the purification of sulphur from 0.06 to 0.01 would mean the use of five pounds of salt, or an expense of from 35 to 15 cents per ton.

The process is covered by patents in this country and abroad. The tests made by different plants have so far given somewhat non-uniform results, and while some plants have obtained very encouraging results, others have failed to get any at all. The European practice appears to have been on the whole more fortunate than the American, but in this country some good results were obtained, chiefly in the elimination of sulphur.

When the fluorine combination is broken up while in

the metal bath, the fluorine unites with the impurities, and thus does its part of work. The metal with which it has been combined is liberated in a nascent state, in which it is particularly anxious to combine with something else. It does so combine, either with the gases present (manganese in the Bessemer converter), or with the steel, forming in the latter case alloys of particularly close grain. The latter is quite natural, since the alloyed metal combines with the iron while in a state of maximum atomization. It is proposed in particular to apply this process to the production of high grade alloy steels, such as armor plate and automobile steels.

Cobalt Steel

The investigations of the University of Berlin have fully established the high qualities of cobalt steel. As fluoride of cobalt can be produced at a very low price and also since cobalt from a fluoride enters into a satisfactory alloy with steel when added in metallic form, it is expected that a cobalt tool steel soon will be placed on the market at a price practically equal to ordinary high speed tool steel.

Fluorspar Production in 1913

Notwithstanding a slight decrease both in quantity and value of the fluorspar produced in the United States in 1913 compared with 1912, the figures for last year were the second largest in the history of the industry, the year 1912 having been a record-breaker. The quantity of domestic fluorspar reported to the United States Geological Survey as marketed in 1913, according to Ernest F. Burchard, in a chapter from "Mineral Resources", 1913, was 115,580 short tons, valued at $736,286, compared with 116,545 short tons, valued at $769,163, in 1912. The average price per ton for the whole country, considering all grades of fluorspar—gravel, lump and ground—was approximately $6.37 a ton in 1913, compared with $6.60 in 1912, a decrease of 23 cents. Fluorspar was produced in 1913 in six states—Illinois, Kentucky, New Mexico, Colorado, New Hampshire and Arizona—these states ranking in the order named.

About 80 per cent of the domestic output of fluorspar is consumed as a flux in basic open-hearth steel furnaces. It is used also as a flux in blast furnaces, iron foundries and silver, copper and lead smelters; in the manufacture of fluorides of iron and manganese for steel fluxing; in the manufacture of glass, enameled and sanitary ware and of hydrofluoric acid; in the production of aluminum; and for many other purposes.

New Jersey Iron Ore Mines

A valuable publication on the geology and mineral resources of northern New Jersey has been issued by the United States Geological Survey in co-operation with the Geological Survey of New Jersey. It covers the area known as the Raritan quadrangle, which includes parts of Hunterdon, Middlesex, Morris, Somerset, Sussex and Warren counties. In addition to the text, it contains an excellent topographic map and several valuable geologic maps.

Iron ore always has been by far the most valuable mineral product of the region. It has been observed at a great number of places and has been mined at many of them.

Ore has been shipped at different times from more than a hundred mines and groups of mines in the Highlands of the quadrangle. The folio describes all the features of the iron ores and gives in detail descriptions of the prominent mines.

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INVENTOR HAS PATENTED A NEW labor saving machine, a device for removing mortar from old brick. He has a working model in course of building but owing to lack of funds needs money to proceed with the undertaking. Big demand for the machine. All work now done by hand labor. To party furnishing sufficient capital to finish the model now building will assign substantial interest in patents. Address A. R. Christman, 1103 Franklin Bank building, Philadelphia, Pa.

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FOR SALE OR LEASE, GRAY IRON foundry, fully equipped; a good proposition for a practical man. Address, Vulcan Iron Works, Houston, Texas.

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